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## NEW STEAMER COMMON-WEALTH.

When the new steamer Commonwealth is placed in service on the Fall River Line between New York and Boston, on July 1, passengers will be transported on Long Island Sound with all the luxury and comfort of the newest ocean liner. The new Commonwealth outrivals in size, speed and magnificence any vessel heretofore built for service on inland waters.

For the construction and equipment and decoration of the Commonwealth, the New England Navigation Co. expended \$2,000,000. The Commonwealth has the double distinction of being the largest and costliest steamer in American waters.

The new steamer will take her place on the line as the flagship of the fleet. This honor passes from the *Priscilla* to the Commonwealth.

With a commanding high bow and true sheer, curving gracefully two-thirds of her length the Commonwealth's broadside is a beautiful model. Her length over all is 456 ft.; breadth of hull, molded, 55 ft.; breadth over guards, 96 ft.; depth of hull, 22 ft. She has sleeping accommodations for 2,000 persons.

Long experience having proved that the side wheel steamer is best adapted to the particular route traveled by the Fall River Line steamers, the new Commonwealth is of this type. The broad beam of the side wheel steamer insures steadiness in a seaway and the ability to deaden headway quickly. Another advantage is the total lack of vibration, a feature which enables passengers to enjoy as restful sleep at night as though they were on land.

The Commonwealth represents the highest achievement of decorative art placed in a steamboat interior. Every detail in the decoration and furnishing

of the boat has been conceived by an artist. The steamer is a striking example of what taste and money can accomplish.

Not confined to one style or period as is usual in steamboat decoration, the architectural adornment of the Commonwealth embraces several periods. As an example of blending of several styles, it would be difficult to find a more satisfactory work.

Stepping aboard the steamer, you enter the quarterdeck. This corresponds to the lobby in a theater. Here are the purser's office, barber shop, cafe and parcel room. Leather upholstered seats offer the traveler an inviting resting place. The style of this room is modern English, the woodwork being oak.

Surmounting the oaken columns are grotesquely carved mariners' heads, forming a corbel. Around this lobby is a high wainscoting, enriched with marquetry panels showing female figures symbolizing navigation and commerce. Above the wainscoting at one end of the lobby is a frieze in three panels. It is one of the most notable works of art in the steamer. It is opalescent painting on maple. The middle panel shows a group of nymphs at a game. In the background a merman sits playing on a flute to an audience of fishes. In the panel at the right, a group of youthful mermen are depicted in the act of releasing a fish which has been hooked by an angler. The other panel of this series shows other mermen engaged in tangling fishermen's lines. Opening off the lobby are the barber shop, finished in white enamel and the cafe, finished in oak. Directly opposite is the purser's office, which is also finished in oak.

Abaft the lobby is the social hall and library. It is a saloon of the period of Louis XVI. The wood trim

and ceiling are panelled in tones of old ivory. The moldings and cornices are embellished with papier mache ornamentations. The bookcases, tables and chairs are of mahogany. A deep rose red carpet completes the sumptuous furnishing of this room.

From the lobby an imposing staircase leads to the saloon deck. Here is a beautifully decorated saloon of the period of Louis XV. The ceiling is panelled with papier mache. The color scheme is creamy white embellished with gold. Carpets and upholstery are of green and the furniture is in harmony with the decorative period. Opening off this saloon are eight parlor suites of the Louis XVI and Louis XV periods, the decorations and furnishings of which are in keeping with the magnificence of the saloons. The beds in these suites are gold plated.

Going forward from this saloon you reach the grand saloon, which extends up through two decks and is the main assembly room of the steamer. The decorations of this splendid room are a delight to the eye. It is a rarely beautiful example of Venetian Gothic style. The whole effect is so artistically pleasing as to evoke the unstinted admiration of art lovers. Nothing of the kind has ever before been attempted in steamboat architecture.

It is the ceiling of this apartment that instantly attracts the eye. It is composed of 15 groined vaultings, enriched with medallions and ornaments. Old galleons alternate with sea emblems as the subject of the medallions. The lunettes are enriched with paintings on canvas, portraying sea monsters engaged in combat and other allegorical figures symbolizing the sea.

The second or gallery deck of the steamer forms a balcony around this saloon. There is also a mezzanine gallery where the orchestra holds



forth. Under the mezzanine gallery are two electroliers of pure Venetian design. Over the musicians' gallery is an allegorical painting typifying the commonwealth. Government, industry and commerce are represented by three female figures.

The supporting piers of the grand saloon are enriched at their angles by twisted columns. The capitals of these columns are reproductions from the columns in the church of San Marco, Venice. The wood trim of this apartment is done in ivory and the carpets and furnishings are of a deep, rich red.

You go from the grand saloon through a passageway finished in soft tones of French gray to the Empire saloon. The wood trim here is of Honduras mahogany with carved ornamentation in gold, toned to produce an antique effect. The carpet and draperies of the saloon are of gold brocade.

The artist has created here a luxurious looking environment, but has carefully avoided excess or garishness.

Ascending a broad stairway from the Empire saloon, you step foot into a saloon of the period of Louis XVI. You are now on the gallery deck and there is still another deck—the dome deck. Forward on the gallery deck are the writing room and the news stand. The decoration of this apartment is in the same tone of French gray as the Louis XVI saloon. All the wood work here is mahogany. The writing desks have glass tops and softly shaded reading lamps. The writing paper bears the Commonwealth's crest which is the combined coats of arms of the states of New York, Connecticut, Rhode Island and Massachusetts worked into a shield. Here are the telephone central exchange and the station of the wireless telegraph service with which all steamers of the Fall River line are equipped. Every state room has a telephone, enabling the passenger to speak with the purser or steward or with a friend occupying another state room.

Strolling aft through a passageway decorated in the period of Louis XV, you come to the Venetian Gothic saloon, another exquisite instance of this beautiful style of decoration. Perhaps you thought that the artist had exhausted the possibilities of this style in his treatment of the grand saloon, but you are pleasantly disappointed.

Aft of the Venetian Gothic saloon on the gallery deck, you enter the Adams saloon, which is finished in

prima vera, stained to give the effect of old satinwood. The panels in this section are decorated panels, done in soft tones and shades of green. The decoration on the frieze in this room is a beautiful example of craftsmanship. It is painted on wood and the character of the work resembles that which you see on beautiful old pieces of satinwood furniture.

Opening off the Adams saloon are parlor suites, richly decorated and furnished in the Louis XV and Louis XVI periods and having private baths attached.

There are staircases on the port and starboard side, finished the same as the woodwork of the Adams saloon, that lead from this saloon to the dome deck.

Here, 50 ft. above the water, are the dining room, men's cafe and the kitchens. Most noteworthy of the many innovations on the Commonwealth is the placing of the dining room on the upper deck.

The broad windows of this room afford a superb outlook over the waters as the steamer speeds on her way. The decorative scheme here is of the period of Louis XVI. The ceiling is divided into three domes which, at night, will be brilliantly illuminated with electric lights, skillfully concealed. The hangings and furniture coverings are red. Like the table linen and silverware, they were specially designed for the Commonwealth. Mirrors completely cover the forward and aft ends of this room.

Opening aft from the dining room is the men's cafe, another innovation on a Sound steamer. This is finished in chestnut and decorated in English renaissance, brought out to a gray tone, with open grain. The walls are paneled in leather in small sections, each of which is studded with nails. Over the buffet is a charming painting of a Spanish galleon, shown against a glowing sky.

Forward of the dining room are the kitchens. These are finished in white enamel and equipped with electric broilers, automatic egg boilers and electrically operated dishwashing machines. This compartment is completely sheathed in iron.

Like all the steamers of the Fall River line, the Commonwealth is built of steel. Seven bulkheads extend to the main deck and they contain no doors to be left open by carelessness. She has a double hull and the space between the bottoms is divided into a great many water-tight compartments. The safety of the steamer is thus assured in case of accident.

There are also collision bulkheads at each side of the steamer at the guards and a bulkhead athwartship.

For safeguarding the steamer and her passengers, every precaution that experience and foresight can suggest has been utilized by the builders of the Commonwealth. She will carry a life-saving crew and will have one-third more life preservers, life rafts and buoys than are required by the United States government regulations.

The Commonwealth will have a speed of 22 miles an hour. Her engine is of the double inclined compound type, with two high pressure cylinders 96 in. in diameter, all having a common stroke of piston of 9 ft. 6 in. The high pressure cylinders are fitted with adjustable cut-offs and the low pressure cylinders with fixed cut-offs.

There are two air pumps driven from the low pressure crossheads. The wheels are of the feathering type with curved steel buckets. Besides the usual auxiliary steam pumps, there is a large pump for use only on the fire sprinkler system. This system consists of 1,800 Grinnell heads, arranged to cover the interior of the steamer in the most thorough manner. Thermostats and a watchman's clock system augment the sprinkler system as safeguards against fire.

Three dynamos furnish current for 3,000 electric lights and a powerful searchlight, as well as power for an electric elevator to the kitchen, and blowers for ventilating the cabins.

The steam steering gear is supplemented by hand steering apparatus and should both of these get out of order, the steamer can be steered by independent auxiliary gear attached direct to the rudder stock.

In the way of comforts and conveniences, no metropolitan hotel can offer more than the Commonwealth. The man who is particular about his appearance, has at his command, while speeding over the waters of Long Island Sound, the services of a valet, barber and bootblack. If he desires to write letters or attend to business matters there is a competent stenographer to assist him, and he may keep in close touch with his office by means of the wireless service.

The Commonwealth was designed by J. Howland Gardner, superintendent of marine construction of the New England Navigation Co. The building of the steamer was supervised by Capt. J. W. Miller, vice president of the New England Navigation Co., and J. Stevenson Taylor, the company's consulting engineer.

The contractors were the Quintard Iron Works of New York. They were associated in the construction by the William Cramp & Sons Ship & Engine Building Co., of Philadelphia. The cabinet work, decorations and furnishings were conceived and executed by the Pottier & Stymus Co., of New York.

#### DULL YEAR IN SCOTCH YARDS.

The record of the ship building half year is the poorest since 1893—on the Clyde at any rate. It has been evident for several months back that the output of new tonnage would decrease steadily until there came a genuine revival in the general shipping trade of the world, but it was scarcely expected that the total for the half-year would be so low as it is now seen to be. For the six months the district can show only 143 vessels of 140,149 tons. Last year in the corresponding period it had 171 vessels of 302,847 tons, so that this year is behind by 28 vessels and 162,638 tons. In other words, the tonnage is less than half that of the first half of last year, and is lower than that of any first half year since 1893, when it was 118,699 tons. The launches during June on the Clyde numbered 22, and make a total of only 25,323 tons. This is better than the 11,072 tons of last month, which was made up of 25 vessels of a much lower average size, but it is considerably less than the average tonnage for the month of June. In June, 1906, there was launched on the Clyde 124,544 tons, but this included the Lusitania, H. M. S. Agamemnon, and several other vessels of large measurement, so that the figures are no standard with which comparisons may be made. To get as low a Clyde total for June as that of this year we must again go back as far as 1893, when the output was 24,366 tons.

Although the record of work done is thus very low, and although very few contracts have been reported recently, there is a fairly general opinion that the bottom of the depression has almost been reached, and that there will be a change for the better at an early date. Immediate prospects are certainly poor, and there is little chance of the second half of the year producing more tonnage than the first, but the decrease in the supply of new vessels is bound to tell on the shipping trade and produce an improved demand. The present falling off is, of course, eminently satisfactory to the ship owners, many of whom find that they already have more vessels than they can utilize profitably, but on the

slightest sign of revival they will be the first to anticipate good trade by ordering new ships. At present they are ordering very few, the only contracts reported during June being: Yarrow & Co., Scotstoun, to build a shallow draft steamer for the Irrawaddy Flotilla Co.; William Hamilton & Co., Port Glasgow, a large steamer on the Isherwood system for Liverpool owners; Charles Connell & Co., Whiteinch, a steamer of 305 ft. for C. T. Bowring & Co., Liverpool; the Ailsa Ship Building Co., Troon and Ayr, five horse boats for the Admiralty, and Ramage & Ferguson, Leith, two steamers, each of 1,200 tons, for James Currie & Co., Leith.

The following table shows the distribution of the six months' tonnage over the different districts of Scotland:

	—Clyde—		—Forth—		—Tay—		—Dce—	
	Vessels.	Tons.	Vessels.	Tons.	Vessels.	Tons.	Vessels.	Tons.
January .....	8	1,969	2	260	2	383	2	180
February .....	32	36,087	2	1,590	2	3,133	6	1,001
March .....	26	22,028	9	2,630	4	6,357	5	452
April .....	30	43,670	1	1,300	2	7,280	15	1,185
May .....	25	11,072	..	.....	2	2,750	6	760
June .....	22	25,323	..	.....	..	.....	8	720
	143	140,149	14	5,780	12	19,903	40	4,298

It will be noticed that no vessels were launched either on the Forth or Tay during June. This is the second consecutive month in which none of the Forth yards have produced any new tonnage. The Clyde figures since 1880 are:

Year—	June. Tons.	Six Months. Tons.
1908.....	25,323	140,149
1907.....	60,455	302,847
1906.....	124,544	336,258
1905.....	39,620	234,736
1904.....	25,877	187,363
1903.....	28,049	187,796
1902.....	39,206	236,009
1901.....	44,909	232,073
1900.....	51,988	214,904
1899.....	36,105	233,155
1898.....	47,862	207,538
1897.....	29,243	149,254
1896.....	27,660	194,243
1895.....	42,080	175,613
1894.....	39,690	165,283
1893.....	24,366	118,699
1892.....	32,609	182,898
1891.....	40,440	167,666
1890.....	26,643	176,295
1889.....	23,511	138,708
1888.....	21,370	95,242
1887.....	17,240	86,565
1886.....	17,502	84,623
1885.....	18,592	94,015
1884.....	32,518	143,986
1883.....	45,458	198,675
1882.....	41,700	168,674
1881.....	29,000	154,844
1880.....	22,528	106,978

#### PREPONDERANCE OF BRITISH SHIPPING.

The elaborate statistics which have been prepared for the 1908-9 edition of Lloyd's Register Book illustrate once more the great preponderance of British shipping as compared with that of other nations. There are entered in the Register Book 11,563 British and Colonial vessels (steam and sail) of 18,709,537

tons gross. America has, on the lakes and seaboard, 3,590 vessels of 4,854,787 tons, Germany has 2,178 of 4,232,145 tons, Norway 2,148 of 1,982,878 tons, France 1,517 of 1,883,894 tons, Italy 1,098 of 1,285,225 tons, Japan 870 vessels of 1,142,468 tons, Russia 1,381 of 974,517 tons, Sweden 1,542 of 904,155 tons, Holland 565 of 876,620 tons, Austria-Hungary 340 of 740,509 tons, Denmark 870 of 733,790 tons, and Spain 551 of 701,278 tons. The United Kingdom total is 9,542 vessels of 17,318,351 tons—nearly four times that of the next highest—the United States. It is also shown that during the year there have been added, by purchase or construction, to the merchant navy of the United Kingdom 425 vessels of 889,073 tons, to that of France 108 of 177,009 tons, to that of Germany 160 of 258,415 tons, to that of Norway 144 of 175,945 tons, to that of Italy 75 of 141,510 tons, and to that of Sweden

75 of 58,147 tons. The same countries have deducted, by loss, sale, or breaking up—United Kingdom, 390 of 565,023 tons; France, 67 of 52,556 tons; Germany, 76 of 112,179 tons; Italy, 64 of 52,079 tons; Norway 160 of 111,744 tons; and Sweden, 75 of 30,271 tons.

#### PASSING OF THE ST. MARY'S.

The historic wooden sloop St. Mary's, of the United States navy, which has been for some time the practice ship of the New York public marine school, has recently been stricken from the naval list and is to be sold. She is of a type of many years ago and has a most interesting history but has so outgrown her usefulness that it is likely that she will be cut down into a coal barge by the purchaser.

The cruiser Frolic, which was converted from a yacht during the Spanish war, is also likely to be sold unless it is found that she is suitable for surveying purposes. She is now in the Philippines, having been out of commission at the Cavite navy yard for several months, and orders have been issued for the auxiliaries of the Atlantic fleet to bring the Frolic with them on the return voyage. She is fitted with six guns and besides her service in the Philippines was stationed for a time on the eastern coast.

The battleship North Dakota, under construction at the Fore River Ship Building Co.'s yard, is about three months ahead of requirements and will probably be launched early in November.

### REPAIRS. ON CANADIAN VESSELS.

The Boston *Evening Transcript* publishes the following from its Ottawa correspondent:

Collingwood is the most jubilant of Ontario cities over the enactment of the amendment to the tariff of 1906 which imposes a duty of twenty-five per cent on repairs made to vessels on the Canadian register at American lake ports. Collingwood is from all accounts nearly as jubilant as Sydney, N. S., was when the Dominion bounties on pig iron and steel ingots were register at American lake ports. Collingwood is the only Ontario lake port at which there is a steel shipbuilding yard and also a modern dry dock of sufficient dimensions to accommodate most of the larger steamers now engaged in the Canadian freight and passenger business.

There are three other steel shipbuilding yards in the province of Ontario—two at Toronto, and the third at Bridgeburg, on the Niagara River. Two of the largest steamers now in the lake trade were built at Bridgeburg; and the older yards at Toronto have quite a long list of large steel vessels to their credit. But neither at Toronto nor at Bridgeburg is there a large dry dock; and the expectation at Collingwood is that all the repair work for which a dock is needed must gravitate to the Georgian Bay port. Last year, according to figures circulated among the boards of trade of the lake and coast cities by advocates of the new amendment to the tariff, Canadian vessel owners spent nearly half a million dollars in repairs made at American lake yards. Repair work is proverbially more profitable to shipyards than new tonnage. This is especially so as regards work which must be done in dry dock; and the political friends of the Collingwood shipyard here are confident that while there is only one large dry dock on the Canadian shores of the Great Lakes, the shipyard of which it forms part must get the greater part of the money that is expended in repairs, and which in previous years has gone to yards at Buffalo, Cleveland and other American ports.

That the Canadian lake ports lacked modern drydock facilities was pointed out to the government by representatives of the Dominion Marine Association, when they were here a few days ago to petition against the new duty on repairs. They came after the bill had been read a first time in the house of commons; and when Mr. Paterson, the minister of customs, moved the second reading he referred to the ship-owners' objections. "I have," he told the house of commons, "met a large deputation representing the shipping interests. But I was not able to depart from the principle of the bill—tariff protection for Canadian ship-

builders—which I think is right." "I think," he continued, "the effect of this bill will be to promote the construction of more docks and shipbuilding yards on the lakes. That is our expectation; but in the meantime until we have those docks we put in this bill that a vessel is not liable for duty on repairs made at other than Canadian ports unless the dock is sufficiently large to take her in. Capitalists who are meditating the construction of another dock will thereby be inclined to construct it of sufficient length in which to make repairs on all vessels navigating the lakes." Mr. Foster, ex-minister of finance, who had cordially supported the principle of the government's ship repairs amendment, objected that it was unfair to the lake transport industry to penalize a vessel owner who could not wait until the dock on the Canadian lakes was available for his vessel. Under such circumstances, he contended, the twenty-five per cent duty should not be charged. "But," answered the minister of customs, "I do not want to let her off under those circumstances." Mr. Foster suggested that a vessel might have to wait a month or two for her turn at a Canadian dock. "Yes," replied the minister of customs, "that may occur to any vessel that wished to dock now. But she must wait her turn. If the captain does not want to wait this turn it would be for him to consider whether it would be better for him to go to a foreign dock and pay the duty involved."

In further justifying the new amendment, Mr. Paterson reminded the house that the coasting trade on the lakes was absolutely reserved to British vessels. "We do not," he said, "allow any vessels to come into competition with vessels registered in Canada; and that being the case, is it unreasonable that the owner of vessels so protected should be required to pay a duty of 25 per cent if he chooses to have repairs to his vessel made in a foreign country, which accords us no such privilege, but charges 50 per cent duty if one of its vessels is repaired in a Canadian ship yard."

The only loop-holes in the bill are those provided in a clause which was inserted after the bill had been read a first time. This clause now reads: "If, however, the owner or master of such vessel shall furnish good and sufficient evidence that the vessel while in the regular course of her voyage was compelled by stress of weather or casualty to put into a foreign port to make the said repairs in order to secure the safety of the vessel or enable her to reach her port of destination, or that it would be impracticable to make the repairs in Can-

ada for the want of a dock of sufficient capacity to receive the vessel, it shall be competent for the minister of customs to authorize a refund of the duty on such repairs, and such vessel shall not be liable to forfeiture. Provided that the repairs in the course of being made to the vessel in that foreign country at the time when this act comes into force, or made prior to such time, shall not be dutiable under the said act."

At the time this bill was before the house of commons, Mr. Fielding made an important statement regarding the order-in-council made in January last excluding all non-British vessels from the coasting trade of the Maritime Provinces. This exclusion is to date from January, 1909; but according to Mr. Fielding's statement it is not to be quite so drastic in its operation as was first intended. The original order was aimed at the modern bulk freighters sailed under the Norwegian flag and manned by Norwegians which for the last 10 years have been in the coal trade between Sydney and other Nova Scotian ports, and Montreal, Quebec and other St. Lawrence ports. Practically all the sea-borne coal used at cities on the St. Lawrence as far up as Prescott, Ontario, comes from Nova Scotia in these Norwegian vessels. The coal interests at both ends of the trade—Montreal and the Sydneys—were in a state of consternation when the order-in-council of January last was promulgated; for there are on the Canadian coastwise register absolutely no steamers to which the business so long carried on in the Norwegian bottoms could be transferred.

The agitation for the exclusion of the Norwegians, which was entirely a Maritime Province affair, and chiefly an affair of Nova Scotia, was almost exclusively confined to ship chandlers and ship repair men. Their case against the Norwegian steamers was that their managers spent no money at Halifax and Sydney; that at the opening of the St. Lawrence season these vessels come out from Norway with sufficient supplies to last them to the end of the season; that they bring spare parts of machinery to the detriment of the repair business at the Nova Scotia ports; and that in order to save money the captains of these vessels when they needed dry dock repairs had even been known to pass the dry dock at Halifax and carry their vessels for dry docking at New York, or some other United States port. In short, the case against the Norwegian steamers—all



of them built, however, in Scotch or English yards—was that they earned good money in carrying coal from Sydney to Montreal, and that their managers carried practically the whole of it out of the Dominion.

The government also viewed the matter in this light and was quick to sympathize with the Halifax and Sydney ship chandlers and ship repair men. It was so quick, in fact, that the order-in-council was issued in ignorance of the fact that there is not a solitary Canadian vessel offering for this Sydney and St. Lawrence coal trade, and that with the Norwegians excluded the trade in 1909 must have come to a standstill; for as Mr. Fielding told the house of commons in the discussion on the minister of customs' ship repairs duty bill, vessels of the type of the Norwegian colliers "could not be duplicated at once, and there are no British vessels of the same class and character"—no vessels in England well adapted to the St. Lawrence coal trade that can be chartered for this business. Hence the order-in-council of January last is to be modified, and January, 1909, will not see the exclusion of the Norwegian steamers from the Sydney and St. Lawrence trade.

#### CANADA SHIPPING ACT.

An act to amend the Canada Shipping Act, which has been introduced in the house of commons by way of the senate, contains many alterations no doubt desirable in the best interests of the service. Among the amended provisions, which more nearly affect navigation companies, are the additions given hereunder.

Sec. 75a to the following effect is added to the bill: "The minister may refuse to admit to the examinations mentioned in the two preceding sections any person domiciled in Canada who is a subject or citizen of a country in which British subjects do not enjoy similar privileges in respect of such examinations." This section is considered to be generally agreeable, and is regarded as a moderate provision in substitution of the bill recently introduced by Mr. Lancaster on similar lines.

Sec. 384 of the act is amended by reducing the Sick Mariners' Tax (Quebec) from 2c to 1½c, tonnage duty, payable three times a year. Subpar. v., par. c., sec. 477, relating to the exemption of vessels "having a draught when loaded not exceeding 16 ft., and employed exclusively in voyages between any port or ports on Lakes Ontario, Erie, Huron, Su-

perior, Michigan, or on any of the waters connecting these lakes, and any port or ports on the River St. Lawrence, or between any ports on the River St. Lawrence," from the compulsory payment of pilotage dues, known as the Fitzpatrick amendment, has been struck out. There appears to be a considerable difference of opinion between the Shipping Federation of Canada and the Dominion Marine Association as to the removal of this paragraph from the bill. The clause was struck out on the representations of the Shipping Federation and the St. Lawrence pilots. The Dominion Marine Association contends that the exclusion of vessels having ports of origin on the lakes from the list of exemptions, is a discrimination against such vessels. It also states that the men already employed on the vessels who are skilled in the navigation of such vessels between Montreal and Lake Superior are quite competent to take their vessels down the lower St. Lawrence; but granting that pilots acquainted with the channels must be engaged between Montreal and Quebec, the association urges that vessel owners should not be compelled to engage men from the limited and special class of "tour de role" pilots, but should be free to employ from the large number of apprentice pilots available, and that in moving vessels between docks in Montreal harbor no pilot should be required.

Sec. 566 is amended to provide, among other things, that an engineer holding a certificate of competency, shall be engaged on each steamboat having a single cylinder engine of 10 N. H. P. and over, or a double cylinder engine of 20 N. H. P. and over. This provision, though good in itself, would undoubtedly act harshly in many cases, such as in outlying minor waters, and in cases where men of ample knowledge and experience are at present employed, but who are unable to pass the necessary examinations. The minister of marine has given an assurance that in such cases permits will be granted, and it is probable that a further amendment may be made to cover this point. It has been requested that the bill be dealt with by committee before making further progress.—*Railway and Marine World*.

Advices from the far east are to the effect that the Mitsu Bishi dock yard at Nagasaki, Japan, has secured the contract for constructing three warships for China.

#### LUSITANIA'S PROPELLERS.

In nautical and engineering circles there has been for the past few days a good deal of surmise as to the nature of the important alterations which it was known were being carried out at the Canada Graving Dock to the propellers of the Cunard royal mail steamer Lusitania. The details of such matters are of necessity not given any more publicity than necessary, but we are in a position to give some indication of the alterations carried out and the results it is hoped they will produce.

In a London daily newspaper yesterday a somewhat circumstantial statement was published to the effect that the changes referred to consisted of giving the forward propellers four blades instead of three.

This, however, is not the case. The alterations which have been carried out are to the after propellers, and consist not of any addition to the number of blades, but to an increase in the size and alteration of the pitch of the blades. Although these changes are naturally experimental, there is every reason to believe that the officials of the company anticipate a remarkable development in the speed of the liner on the west-bound voyage, which she will commence from Liverpool on Saturday. Indeed, those well able to speak with some authority on the subject expect that, given favorable weather, the Lusitania will maintain from Daunt's Rock to Sandy Hook an average speed of 27 knots to the hour.

The question of propellers in relation to turbines has become one of the most interesting engineering subjects, and from the time of their trial runs the Lusitania and Mauretania have in this respect been watched with much attention, and the results of the changes already made have been highly satisfactory.

It was chiefly the mishap to one of the propellers of the Mauretania which drew attention to the greater potentialities of the after propellers. Investigation showed that on a hundred per cent basis of power between the two forward and two after propellers, the latter only showed between them 20 per cent.

The case of the Mauretania and subsequent experiments seem to have shown that this condition in the aft propellers was due to the fact that their blades were unable to secure the most satisfactory hold on the turbulent and broken water as it passed from the forward propellers.

As a consequence it was decided to enter upon another experiment with the Lusitania. The blades on the aft propellers have been considerably enlarged so that they almost resemble a disc, while the pitch has also been altered

with a view to considerably developing efficiency in gripping the water.—*Liverpool Journal of Commerce*.

#### NAVAL EXPERTS IN CONFERENCE.

A special board of officers representing the seagoing element as well as the construction experts of the navy has been appointed to consider modifications in the present type of battleship in order to meet the criticism directed against the present method of construction. The members of the board are as follows: Rear Admiral Casper F. Goodrich, commandant New York navy yard; William S. Cowles, chief of the bureau of equipment; Albert R. Couden, president of the examining and retiring boards; William Swift, commandant of the Boston navy yard; Capt. Royal R. Ingersoll, of the general board; Capt. Nathan E. Niles, commanding the training ship, Hancock; Capt. Charles J. Badger, superintendent of the naval academy and Constructors David W. Tawyor and Richard H. Robinson. Capt. Ingersoll served as chief of staff of the Atlantic fleet and Constructor Robinson was on the flagship Connecticut during the cruise to the Pacific recently. Instructions have been issued to the board to discuss all questions which tend to promote the fighting efficiency of the ships as well as the safety of the men on board. The location of the armor belt as well as its width and thickness will be considered as well as the relocation of guns and searchlights.

The first meeting of the board was held at the naval war college at New port, R. I., July 11.

#### OIL FUEL ON CUNARD LINERS.

It is not generally known that the giant Cunarders Lusitania and Mauretania would have been fitted for the use of oil fuel but for the fact that the company could not make arrangements for the regular and adequate supplies of oil. Sir William White, who was consulting naval architect for the Mauretania, states that the question of using oil fuel was carefully considered during the designing stage.

"It was recognized," he says, in the course of an article on the subject, "that by the use of oil there would be a considerable gain in weight and space required for fuel, large economies of labor in the stokehold and the numbers in its staff, easier regulation of the steam, and more uniform production, as well as consid-

erable advantages in shipping fresh supplies of fuel in port. Guarantees of regular supplies at acceptable prices could not be obtained, however, and the use of coal was decided upon; but it would be an easy matter to adopt oil fuel at any time either wholly or as an auxiliary to coal, if the conditions favored that course."

#### DEATH OF REAR ADMIRAL THOMAS.

Rear Admiral Charles M. Thomas, U. S. N., who died at Del Monte, Cal., July 3, 1908, from a stroke of apoplexy, was one of the most popular officers in the service and will be remembered for his efforts to improve the condition and efficiency of the enlisted personnel as well as for the many important duties which he performed during his career. Admiral Thomas was second in command of the Atlantic fleet in its voyage to the Pacific and assumed command of the fleet after Rear Admiral Evans was obliged to retire therefrom. This post he voluntarily relinquished in order that Rear Admiral Charles S. Sperry might have an opportunity to familiarize himself with all the details of the command prior to the date of Rear Admiral Thomas' retirement for age which would have occurred Oct. 1, and which therefore prevented his assuming permanent command of the fleet on the trip to the Orient.

Rear Admiral Thomas was born in Philadelphia, Oct. 1, 1846, was graduated from the naval academy in 1865 and in November, 1874, was married to Miss Ruth Simpson, daughter of Rear Admiral Edward Simpson. After promotion through the different grades he became Rear Admiral Jan. 12, 1905.

#### NEW STEAMSHIP SERVICE TO PANAMA.

That the two steamship companies which have headquarters at Valparaiso, Chile, are contemplating the idea of a 12-day service between Valparaiso and Panama, is announced by Vice Consul Stuart K. Upton, of the former port.

"The plan is to send the Atlantic vessels of the Pacific Co., whose itinerary has been between English ports and Valparaiso, on to Callao, with a possible stop at Iquique. At Callao mails and passengers will be transferred to one of the regular west coast liners, which will call at Payta, Peru, and at Puna, the port for Guayaquil, only. This will avoid the delay incident upon calling at some

20 small ports on the coast of Chili and Peru. If there is no hitch in the program the new service will begin some time in September or October."

#### IMMIGRATION FALLING OFF.

The very large falling off in immigration during the first six months of the year 1908, as shown by the statement prepared for the steamship companies, is very noticeable and if there is not a decided increase in immigration during the next half year over what is shown for the previous six months the total immigration for 1908 will be less than 400,000.

On the other hand almost double the number of steerage passengers—representing the laboring classes of the country—have returned to their native lands, as compared with the number of aliens who have arrived during the same period. The exodus is also twice as great during the first half of 1908 as for the entire year 1907.

#### MORE DOCKS AT TACOMA.

The Chicago, Milwaukee & St. Paul Railroad Co. has plans well under way which when completed will give to Tacoma, Wash., the most extensive dock and wharf facilities owned and operated by any one railroad on the Pacific coast.

Included in the plan is the dredging of a private waterway to a length of 3,200 ft. at a depth of 35 ft. and when the project has been completed there will have been added to the city's docks and wharfs 19,005 ft., or a little less than four miles. The railroad company's holdings on the water front itself would have permitted of but 2,000 ft. of dockage facilities.

#### NEW WHARFAGE RATE AT NEW YORK.

The department of docks and ferries of the city of New York has just issued an order applying to all vessels over 98 ft. in length and which provides that they shall hereafter pay wharfage to the city at the rate of one cent per running foot. The purpose of this order is to exclude coal barges and several other classes of harbor craft from the 50 cents a day charges accorded to canal boats under charter.

Over a year ago the one cent per running foot rule for all except canal boats was made but coal barges and some others, for the reason that their owners had made contracts far ahead based on the 50 cents per day basis, were allowed to continue at that rate.



## SHIP BUILDING IN THE UNITED STATES.

Alexander Charles, of Camden, N. J., contributes the following interesting article to *The Shipbuilder*, published at Newcastle-on-Tyne:

Although iron and steel ship building was practiced in the United States almost as early as in Britain, its development until the past 20 years was slow and uncertain.

During the past two decades the rise of ship building has been coincident and parallel with the rapid growth of the American navy, the upbuilding of which has contributed more than any other cause to the progress of the industry. Previous to 1890 there were only two yards on the Atlantic coast which had built vessels of a displacement greater than 5,000 tons. Today there are eight yards which can undertake work of the heaviest kind; six of these yards have already completed battleships and cruisers of the first class and four of the eight have a capacity and equipment rivaling anything of the kind in Europe.

Immediately after the close of the Spanish war—principally owing to the prospect of a ship subsidy bill being passed in congress—there was a spurt in ship building; but as time went on, and the chances of such a bill becoming law became more remote, the boom died away. At the present time there seems to have set in a period of stagnation, and were it not for the naval programs the immediate outlook would appear gloomy. Meanwhile the shipping world is in hopes that as the Panama canal approaches completion, congress may some day soon awake and realize the growing need of legislation with a view to fostering and placing the shipping interests on a more permanent and stable basis. Although at the present time the shipping industry of the country is in a measure stationary, it is in reality only marking time, and the prospects for the future are encouraging. The construction of the canal, now making such rapid strides and within measurable distance of completion, cannot fail, in the writer's opinion, to give the shipping trade a tremendous impulse, and relieve the railroads of the already highly congested trans-continental trade, diverting it more cheaply and with greater safety to the ocean route. Today the American ship owner and ship builder alike are sustained by the conviction that the dawn of a brighter era is at

hand, and that soon from Bath, Me., to Newport News, Va., the hum of renewed energy will be heard and the resources of the yards of the country will be taxed to their utmost capacity.

The routine work of a ship yard in the United States is pretty much akin to that of a British yard. With a scarcity of skilled platers, framers, etc., most of the yards resort to the mold or template system, which is in general operation both in the lake and coast establishments, and in some places more than others. It is extensively carried out in the lake ship yards, where the class of work done lends itself readily to the system. It has, however, been brought to the highest degree of efficiency in one of the Delaware yards, where some remarkable results have been achieved. In this establishment—the most modern and up-to-date in America or, in fact, anywhere—the whole arrangement of the plant has been devised with a view to the rapid handling of structural work. Pneumatic riveting, calking and chipping; shears, punches, drills and planers operated by independent electric motors; overhead traveling cranes everywhere, even over the vessels in the wet dock, are features of this yard, and the entire plant is roofed in so that work can proceed in all weathers. It is no uncommon experience to have half of a ship's shell plating in position before a single frame is erected; while entire bulkheads, completely riveted and calked, are lifted by the overhead cranes and put into position. The use of ribbands for keeping the vessel fair is thus entirely abolished, following closely the mode of procedure in bridge construction; every clip or bracket that can be assembled is riveted in the shops before going on board. Despite the dire forebodings of the experts of the old school that this innovation was impracticable and would end disastrously, its success has been complete, and the regularity and fairness of rivet holes and general excellence of work speak for themselves. To attain this high standard, of course, the greatest care and attention are absolutely necessary in the laying out and development of work in the mold loft, but with such results the end justifies the means.

About nine years ago, it will be recalled, most of the shipbuilding yards on the great lakes were merged into a trust with headquarters at Cleveland, O. That this combine can pro-

duce cheaper work than the old independent yards seems evident, for practically one management and office staff carry on the work instead of a separate staff at each yard. In dealing with ship building on the great lakes, however, it should be borne in mind that no war vessels are constructed there, and that the merchant ships are of the simplest design and built to suit the peculiar conditions obtaining on the lakes. Some six years ago an attempt was made to consolidate all the Atlantic coast yards in a similar manner to those on the lakes. Only three yards on the east coast and one in San Francisco came into line, however, and after a year or two of precarious existence the affair collapsed and came to a somewhat inglorious end.

With the coast ship yards in the United States so well equipped to carry out work on a large scale, and to build vessels in excess of the present demand, competition is naturally keen and prices are low, so low in fact as to verge closely on prices in Britain. This was evidenced last summer, when one firm in Virginia undertook to build the hull and machinery of a 20,000-ton battleship of the Dreadnought class, exclusive of armor or armament, for slightly lower than \$4,000,000, the highest bid for the vessel being \$5,000,000. While we have not yet attained the rapidity of construction of the British yards, especially in warship work, it is more the fault of the naval bureau than the contractors, who are generally handicapped with endless changes in detail. The writer has no doubt, if the government desired to rush work on a battleship in order to make a time test, that most of the yards would be equal to the demand and that the present record of 40 months would be considerably reduced. In reviewing the progress of ship building in the United States during the past 20 years—a time coeval with the growth of the new navy, with its splendid array of battleships, cruisers and torpedo craft, second only in some respects to those of Great Britain and entirely the creation of American ship yards—the fact should not be lost sight of that we have also during this time built war vessels for Japan, Russia and Turkey, and kept pace with the growing demands of our merchant marine. It will thus be readily conceded that the achievements of our ship builders, even under adverse conditions, have not been insignificant.



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#### THE DOCUMENT IN EVIDENCE.

The planks of both political parties  
upon the subject of the merchant  
marine are brief. The Democrats  
say:

"We believe in the upbuilding of the  
American merchant marine without  
new or additional burdens upon the  
people and without bounties from the  
public treasury."

The Republicans say:

"We adhere to the Republican doc-  
trine of encouragement to American  
shipping and urge such legislation as  
will revive the merchant marine pres-  
tige of the country, so essential to  
national defence, the enlargement of  
foreign trade and the industrial pros-  
perity of our people."

The Democratic platform requires  
no discussion. It means nothing but  
free ships. The policy of free ships  
might be tried out until the day of  
judgment without doing the American  
merchant marine a particle of good.

The time to talk about the mer-  
chant marine is past; the time to act  
has come. If it were possible to get  
a referendum vote on the subject of  
shipping it would carry by an enor-  
mous majority. Regular organizations  
such as boards of trades throughout  
the country have declared for it time  
and time again and delegation after  
delegation have journeyed to Wash-  
ington to advocate it. Yet the Amer-  
ican government remains obdurate and  
nothing has been done. Measures of  
relief are invariably defeated. The re-  
sult is that American shipping has  
now reached the lowest point of stag-  
nation. To prove this we have but  
to take one example from current life.  
Looking across the New York harbor  
and pointing to a five-masted schooner,  
which has been lying idle for five  
weeks at her moorings with no pros-  
pect of employment, Mr. Potter, of  
the Luckenbach Towing & Transpor-  
tation Co., said:

"The docks are full of idle ships.  
And it is not only New York, but the  
same condition prevails at Boston,  
Newport News, Baltimore and Phila-  
delphia. Of our own ships there are  
five laid off with nothing to do. One  
vessel of 6,500 tons that cost \$380,000  
three years ago can't find profitable  
employment. The home steamer has  
no show against the foreign steamer.  
She can't get any freight to pay when  
the higher cost of the seamen's wages  
is added compared with that of foreign  
vessels, and we don't get any freight  
even from the government to help us  
along. The government is building the  
Panama canal with the nation's mon-  
ey, but foreign ships are being em-  
ployed to take the supplies down there  
when American steamers are available  
and plenty of them. How is it that  
congress insists on American engi-  
neers only being employed on the  
canal and American manufactures for  
the army in the Philippines while  
nothing is done for the American  
mercantile marine? There must be 14  
or 15 larger vessels laid up in the  
harbor with a total of 100,000 tonnage.  
Those of moderate size could be used  
for transporting cement and other sup-  
plies, and are suitable for the docks

and waterways, but congress must go  
and purchase two 12,000-ton vessels  
drawing 28 or 29 ft. of water, when  
they are not wanted. The govern-  
ment is quite inconsistent. It builds  
the collier Vesta, which with its crew  
and equipment will make the cost of  
transporting coal very much more  
than by an ordinary native ship, and  
yet when any aid is asked for the  
home mercantile marine congress  
turns down every application. We  
have to live up to strict laws, and if  
the food, with meat and chicken, isn't  
supplied according to schedule, we're  
hauled into court. The foreigner pays  
his crew at the rate of \$12 or \$13 a  
month, whereas we have to pay \$25.  
Last year we seemed to be going  
along smoothly, but this depression  
has quite knocked us back."

This is a document from life. What  
more does congress need to convince  
it of the imperative necessity of legis-  
lation in behalf of the American mer-  
chant marine? Why should there be  
this holy horror of subsidy? Every  
country that has a merchant marine  
subsidizes it. Why should the  
United States stand aloof when the  
evidence of its folly accumulates on  
all sides?

#### LAKE FREIGHT SITUATION.

While the volume of freight moved  
on the Great Lakes during 1908 will  
probably be greater than any movement  
prior to 1902 this season will be remem-  
bered as one of the most disastrous in  
lake history. The proportionate depres-  
sion is greater than has ever been ex-  
perienced, far greater than the depression  
following the panic of 1893. In 1892 the  
movement of ore was 9,072,242 tons; in  
1893 it fell to 6,055,716 tons. The move-  
ment in 1894 was 7,748,312 tons; in 1895  
it reached 10,422,037 tons, falling in 1896  
to 9,934,928 tons. It was not until 1897  
that the period of normal increase was  
reached, when 12,469,638 tons were  
moved. Judged by these figures it took  
about four years or more to recover from  
the depression of 1893.

The present depression is far more  
drastic. Last year 42,000,000 tons of ore  
were moved on the lakes. This year it is  
not likely that more than 21,000,000 tons  
will be moved, a reduction of 50 per cent.  
Such an abrupt curtailment has deranged  
the whole lake system. Methods of oper-  
ation have to be revised constantly. It  
was thought that by withholding the open-



ing of the navigation arbitrarily until July 1 that affairs would then proceed upon a normal basis, but it has developed that more ships were thrown into commission than could be cared for.

The whole month of July has marked the steady withdrawal of tonnage from the active market. More than one-half the wild vessels are laid up and many of the ships of the leading shipping interests have not been put into commission at all. Captains of small vessels are seeking berths as mates, and some are unable to find employment at all. Leading shippers that have to carry coal north to supply their own wants are finding it cheaper to charter tonnage than to send their own ships up with coal and return light. Very few of the steamers that were launched during the present year have been sent out and will not be until there is some business in sight.

In the face of such conditions as these he is a brave soul who talks of ordering ships, yet there are tentative negotiations for new ships, proving after all that hope is man's eternal blessing.

#### PIG IRON SITUATION.

Improvement is slow, but nevertheless real, and considering that it comes in mid-summer when there is almost always considerable diminution in demand for iron and steel products and decreased activity of mills, is very encouraging. While few noteworthy sales of pig iron have been made, the market for foundry grades in the central west is marked by a strong undertone and prices are fairly well maintained. In the south, several interests are willing to sell on a basis of \$11.50 Birmingham for No. 2 foundry, but some companies hold out for \$12.

Rail orders aggregating 23,000 tons have been received this week. The demand for light rails is improving. An eastern manufacturer has purchased 3,500 tons of billets for early delivery. The demand for wire products is again active.

Some coke is being sold for prompt delivery at low quotations, but on contracts prices are well maintained. The demand for old material is stronger and prices are firmer. A leading railroad interest has just contracted for machine tools amounting to \$325,000. The Worth Bros. Co., Coatesville, Pa., has begun the erection of a blast furnace of 450 tons daily capacity.

#### RECORD OF THE HUNTSBERRY CLAM-SHELL BUCKET.

Two records of interest in ore unloading have just been made on the Cleveland & Pittsburg ore docks in Cleveland. This dock is equipped with a Hoover & Mason unloaders operating six clam-shell buckets, five of the buckets being of Hoover & Mason design and the sixth

the new Huntsberry clam-shell bucket described in the issue of the MARINE REVIEW of June 18 and July 9. The steamer Republic went to the dock July 20 with a cargo of 4,382 tons of ore, consisting of 766 tons of Harper ore, 1,231 tons of Cyclops, 1,535 tons of Vulcan and 849 tons of Pluto. The Huntsberry bucket worked exclusively in the Pluto ore, which is lumpy and difficult to handle, taking out all of it, discharging it in seven hours working time, an average of 121 tons per hour. The remainder of the cargo, consisting of 3,533 tons, was discharged by the five Hoover & Mason buckets, three of the buckets working 10 hours each, one 9 hours and one 8 hours and 30 minutes, a total of 47½ working hours, an average of 706 tons per rig or 74.3 tons per hour. The Republic is, of course, an old-style vessel and does not lend herself to dispatch in unloading.

On July 21 the steamer B. F. Jones went to the dock with 10,610 tons of ore of which the Huntsberry bucket discharged 2,600 tons in 14 working hours, an average of 185 tons per hour. The balance of 8,010 tons was discharged by the five Hoover & Mason buckets, two working 14 hours each, two 13 hours each and one 11 hours, a total of 65 working hours, an average of 1,602 tons per rig or 123 tons per hour. The Jones is a modern steamer with 12-ft. hatches, lending itself structurally to rapid discharge; but in both instances the greater efficiency of the Huntsberry bucket is marked, being over 50 per cent greater in both cases.

#### AKERS EMERGENCY GEAR ON THE BARLUM.

On the official test of the Akers emergency gear on the steamer Thomas Barlum on July 21 near Colchester reef the change from the regular to the Akers emergency gear was made in four seconds. The test was under the supervision of Capt. E. C. Akers, general superintendent of the Akers Steering Gear Co., and the time was taken by Capt. Murray G. McIntosh, master of the Barlum. It is the quickest time yet made in a trial.

#### LONGSHOREMEN'S ASSOCIATION.

Daniel J. Keefe was unanimously elected president of the International Longshoremen's Association at Erie this week. Mr. Keefe has been at the head of the organization for 25 years and it was his desire to retire at the present time, but the convention insisted in thrusting the office upon him. J. J. Joyce, of Detroit, was elected secretary and treasurer.

The other officers are T. V. O'Connor, of Buffalo, first vice president; W. E. Fuller, second vice president; Claud Worth, of Detroit, third vice president; Mat Kellerher, of Ashtabula, fourth vice president; Wm. Kelley, of Ogdensburg, fifth vice president; O. A. Aderan, of Galveston, sixth vice president; J. H. Anderson, of Toronto, seventh vice president; G. E. Neeshan, of Pittsburg, eighth vice president, and Louis Barnett, of Mobile, ninth vice president. The next convention of the association will be held in Galveston.

#### IMPROVEMENTS AT LORAIN YARD.

At the meeting of the Board of Directors of the American Ship Building Company on Wednesday of last week it was decided to set aside \$400,000 to complete the improvement at the Lorain yard, including a new boiler and machine shops. These improvements will make the Lorain yard self-contained; all machinery designed for vessels building at Lorain having hitherto been built at the Cleveland yard and shipped to Lorain. The new shops will be located south of the present plant. When these improvements are completed the Lorain yard will be the largest ship yard on the lakes, and will be capable of turning out twelve steamers, complete in every detail, annually.

#### PORT OF GARY OPENED.

The port of Gary was formally opened on Thursday of this week by the arrival of the steamer E. H. Gary of the Pittsburgh Steamship Co.'s fleet with a cargo of ore from the head of the lakes. Twenty-one guns were fired as the freighter entered the harbor. The port is named in honor of Judge E. H. Gary, chairman of the board of directors of the United States Steel Corporation. The town was founded by the Steel Corporation and will eventually have one of the largest, if not the largest, steel plant in the world. Officials of the Steel Corporation attended from New York, Chicago and Cleveland, together with a distinguished gathering of men in public life, including Mr. Kern, the Democratic candidate for Vice President of the United States. Further attention to this event will be given in the REVIEW of next week.

#### CONTRACT FOR FIRE TUG.

The Duluth & Mesabi Railway Co. has given contract to the American Ship Building Co. for a fire tug to be 125 ft. long, 30 ft. beam and 15 ft. deep. The tug will be used to protect dock property at the head of the lakes.

# LAKE SHIP YARD METHODS OF STEEL SHIP CONSTRUCTION.

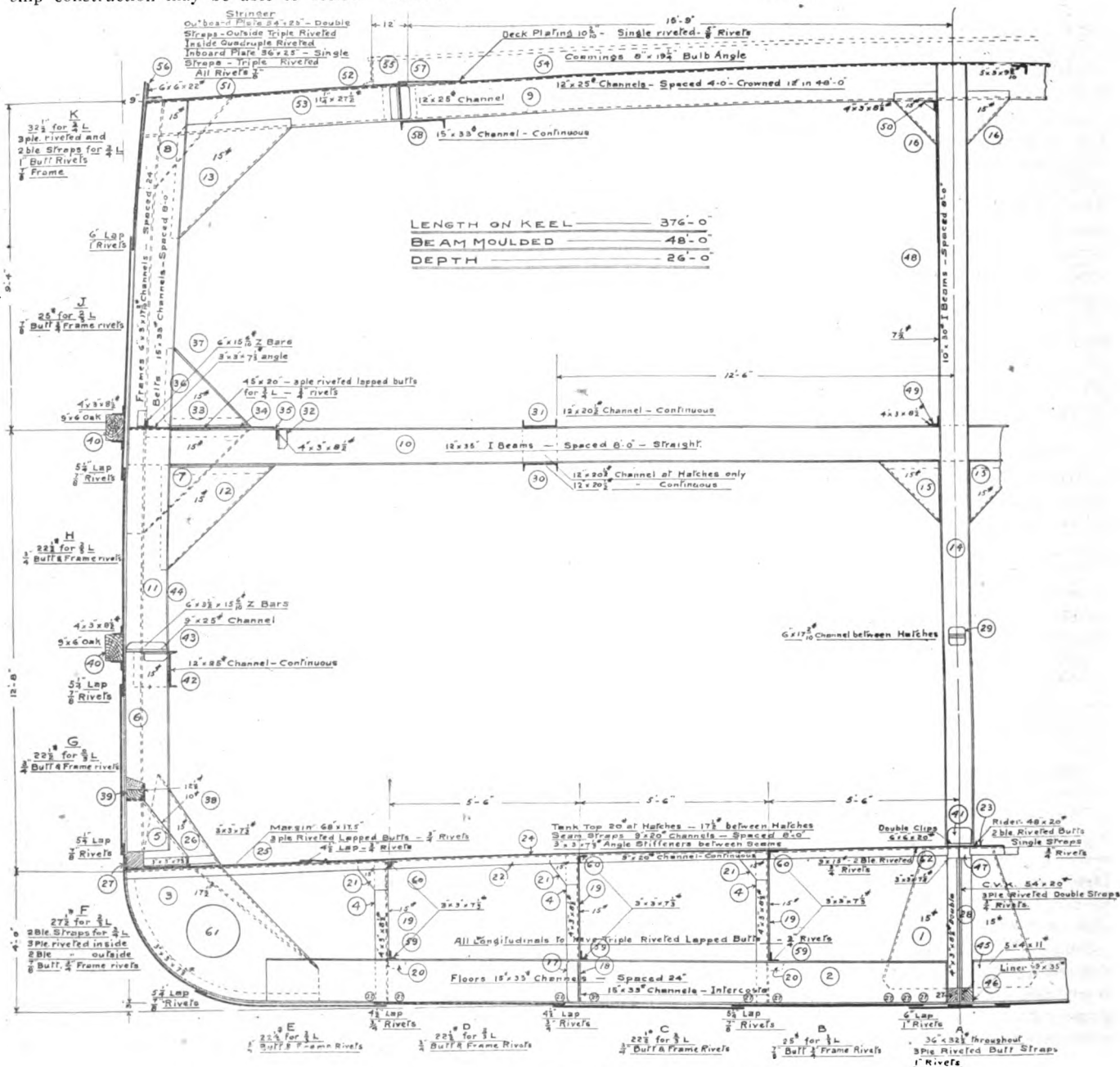
BY ROBERT CURR.

A request has been made to describe the various midship sections so that those not familiar with terms in steel ship construction may be able to follow

with main deck beams and hold stanchions.

There are quite a number of vessels of this type of construction, only the beams and stanchions in way of the hatches on the main deck have been taken out to facilitate the unloading of the vessels.

8. Spar deck beam bracket.
9. Spar deck beam.
10. Main deck beam.
11. Web frame.
12. Main deck beam bracket to web frame.
13. Spar deck beam bracket to web frame.



up the articles now running in the MARINE REVIEW.

The following midship section shows 71 items which may be of interest to those reading the articles and not fully acquainted with the terms.

This section shows the type of construction in the year 1898, and the following sections will show the up to date vessels.

This midship section shows the vessel

The beam spacing in way of the hatch openings in nearly all cases, are 24 feet now on the main deck.

## MIDSHIP SECTION.

1. Center keelson bracket.
2. Floor channel.
3. Bilge bracket.
4. Girder stiffeners.
5. Top side frame bracket.
6. Top side frame.
7. Main deck beam bracket.

14. Hold stanchions.
15. Main deck beam bracket to stanchions.
16. Spar deck beam bracket to stanchions.
17. Intercostal clips.
18. Intercostals.
19. Continuous girder plates.
20. Continuous girder angle clips.
21. Continuous girder stiffener brackets.



22. Channel seam strap.
23. Rider plate.
24. Tank top plating.
25. Tank top margin plate.
26. Web frame bracket plates.
27. Watercourses.
28. Center keelson plate.
29. Hold stanchion braces.
30. Lower main deck ties.
31. Upper main deck ties.
32. Main deck face angle clips.
33. Web frame brackets to main deck.
34. Main deck stringers.
35. Main deck stringer face angles.
36. Main deck stringer angles.
37. Main deck stringer intercostals.
38. Steel hold ceiling.
39. Bilge ceiling cement.
40. Fenders.
41. Hold stanchion clips.
42. Side stringers.
43. Side stringers intercostals.
44. Side stringers intercostals.
45. Keel angles.
46. Keel liners.
47. Center keelson top angles.
48. Shifting board plates.
49. Shifting board bottom angles.
50. Shifting board top angles.
51. Outer spar deck stringer.
52. Inner spar deck stringer.
53. Spar deck stringer seam strap.
54. Spar deck plating.
55. Hatch coaming.
56. Spar deck stringer angle.
57. Spar deck intercostal.
58. Spar deck channel girder.
59. Continuous girder bottom angle.
60. Continuous girder top angle.
61. Bilge bracket lightening hole.
62. Rider plate edge straps.
- A. Keel plate.
- B. B strake.
- C. C strake.
- D. D strake.
- E. E strake.
- F. Bilge strake.
- G. G strake.
- H. H strake.
- J. J strake.
- K. Sheer strake.

One, the center keelson bracket, 2 channel floor, 3 bilge bracket, 4 girder stiffeners, 17 intercostal clips, 20 girder angle clips, 21 girder stiffener bracket plates and 22 channel seam strap compose the bottom framing of the ship. The top-side framing is composed of 5 frame bracket, 6 channel frame, 7 main deck beam brackets, 8 spar deck beam bracket and side stringer clips shown at main deck and side stringers, 11 web frame channels, 12, 13 and 26 brackets and side stringers, side stringer clips.

The tank top is composed of 3 plates, the tank top rider 23, tank top plating 24 and margin 25.

The margin plate is flanged to the shell on bilge strake F.

The rider plate is connected to the

tank top plating with edge strips, 61 fitted between tank top stiffeners which run across the tank similar to the seam straps. The side stringers are composed of continuous channel 42, and intercostals 43 and 44.

The main deck stringers 34, stringer angles 36, face angles 35, beams 10, and channels ties 30 and 31 compose the main deck.

The hold stanchions are composed of I section, 14 fastened to tank top with clips 41, and braced with channels 29.

The shifting boards run between the spar and main decks and stiffened with angles top and bottom, as shown by 48, 49 and 50.

The bilge ceiling 38, is made of steel plate and angle, and filled in with cement on top, as shown by 39.

The fenders are composed of oak and angle iron, as shown by 40.

The spar deck stringers 51 and 52 are composed of 2 plates and fastened together with seam straps, 53.

The deck plating 54, runs across the deck in one piece and connected to the stringer plating.

The channel girder under the spar deck is composed of intercostal channel 57, and continuous channel 58. The hatch coamings 55, are of the bulb angle section and welded at the corners.

The spar deck beams are of the channel section and spaced four (4) feet apart.

The stringer angle 56, runs from fore-castle to stern and butt strapped to make it continuous.

The shell plating is all lapped on the seams. The butts also with the exception of bilge strake F. and sheer strake K. which are double butt strapped.

#### WORLD'S FASTEST VESSEL.

The British torpedo destroyer Swift, which was launched late last year at the yard of Cammell, Laird & Co., Birkenhead, Eng., underwent her speed trials in the Irish sea recently, and it is understood that she achieved a speed of nearly 38 knots during certain portions of the run, thus establishing her claim to be the fastest vessel afloat of her kind. She is one of the newest type of ocean-going torpedo destroyers and both in her dimensions and engine power is a considerable enlargement upon the Tribal class, which have a speed of 33 knots. The contract speed of the Swift is 36 knots. Her principal dimensions are: Length between perpendiculars, 345 ft.; breadth, 34 ft.; depth, 20 ft. 4 in.; with a displacement at her mean load draft of about 1,800.

Her armament consists of four 4-in. breech loading guns, two on the fore-

castle and two on the upper deck; and two 18-inch torpedo tubes on the upper deck. She is fitted with quadruple turbine machinery of the Parsons type, made at Messrs. Cammell, Laird & Co.'s works, Birkenhead. The turbines drive four shafts, there being one propeller on each shaft.

The turbines are placed in two distinct engine rooms in order to minimize the capacity of any one watertight compartment, and several novelties have been introduced in order to accommodate machinery of the large power required in the comparatively small space at disposal. There is an installation of 12 boilers of the express straight tube type, these being arranged for the burning of oil fuel. The boilers have been built by the firm at their Beaufort road works.

#### GOOD PERFORMANCE BY BRITISH SUBMARINES.

A flotilla of 17 submarines has completed an unparalleled journey from Dover up the east coast of England for 394 miles under war conditions, each with a crew of 16 officers and men. They remained under water for the entire distance except for their conning towers. These submarines are a British development of the original Holland design, obtained from the United States eight years ago. The capabilities of this newer type of submarines has been clearly demonstrated as they have been shown to be fit to go anywhere and do anything. The cruise occupied 40 hours.

The flotilla in question belongs to the B and C classes, with a displacement, submerged, of 313 tons, and are fitted with two torpedo tubes. A great degree of habitability has been obtained in these craft which cruise on the surface with gasoline engines, and, as this performance indicates, have an average of 10 knots for a very long period, in an awash condition. When completely submerged they are propelled by electrical energy at a speed of about eight knots.

James F. Paige, supervising constructor of engines at the yard of the Fore River Ship Building Co., Quincy, Mass., has gone to Japan where he is to take charge of the installation of the great turbine engines built at Quincy for the Japanese battleship Aki, of 20,000 tons, and the armored cruiser Ibuki. The turbines are of the Curtis type, with which the scout cruiser Salem has just made a world's record.

## ATLANTIC COAST GOSSIP.

Office of the MARINE REVIEW,  
Room 1005, No. 90 West St.,  
New York City.

The Lusitania is still in the trans-Atlantic record-breaking business. A cable message received at New York on Monday night gave 11:33 as the time of the big Cunarder's arrival at Queenstown, making her time for the eastward journey from New York 5 days and 37 minutes. This is 2 hours and 44 minutes better than the record—also made by the Lusitania—of June 2.

The new steamer Amelia, built at the yards of Swan Hunter & Wigham Richardson, Ltd., Wallsend-on-Tyne, for the Donald line, arrived at New York this week. The Amelia is chartered by the Atlantic Fruit Co. for the West Indian banana trade, and has been especially built for this service. She is one of four new steamers built for the Donald line, and arrived from Port Antonio, Jamaica. Her average speed is about 13 knots.

The William L. Douglas, a six-masted schooner belonging to the Crowley Transportation Co., went ashore in Vineyard Sound on Saturday evening while coming to anchor in a dense fog. A revenue cutter and two tugs endeavored to float her on Sunday, but were not successful, the Douglas floating later unassisted. She was bound from Baltimore to Boston with a cargo of 5,960 tons of coal.

The armored cruiser Montana, of 14,500 tons, will be commissioned at the Norfolk navy yard this week. She will have a crew of 40 officers and 821 men.

The lighthouse tender Cyprus left the yard of the New York Ship Building Co., Camden, this week, for Tompkinsville, where she will be fitted out for service on the Pacific.

Captain Gunn and nine officers of the British steamer Stratheyre, in affidavits made at Norfolk, deny charges of cruelty and hardship toward their crew of Chinese, two of whom were drowned in an attempt to desert the vessel at New York. They state that at 20 different ports during the past year troublemakers in the crew preferred similar charges, with exoneration in every instance.

The Norwegian steamship Frey left Thomson's Point this week with one of the largest cargoes of dynamite that has been sent from this country. The shipments, which are consigned to the Isthmian canal commission, consist of 600 tons of the explosive, the greater part of which was loaded at Baltimore.

Albert Ballin, director general of the Hamburg-American Steamship line, whose

resignation from that position was recently rumored, says that the report is without foundation.

Captain Heath, of the British steamship Manchester Corporation, which arrived at Philadelphia recently from Manchester, reported passing an iceberg 120 ft. high and 300 ft. long in latitude 48:30:30 north, and longitude 49:40:30 west.

The disabled steamer H. M. Whitney has arrived at Cramp's yard, Philadelphia, for repairs.

An anchor and chain which had been lying at the bottom of the Delaware river for several years was picked up off Reedy Island recently by the anchor of the British steamer Harport.

Captain A. G. Thomson, of the Scandinavian-American liner C. F. Tietjen, on his arrival at the vessel's home port this week completes his three-hundredth voyage across the Atlantic. He has been with the company for 26 years, and has commanded several of their finest vessels. On his arrival at the home port he will receive a gold medal from King Oscar II, in commemoration of his long service. When he had made 100 trips he was honored with a bronze medal, and on completion of his two-hundredth voyage received a silver medal.

The three-masted schooner Henry F. Whitney, from Rockland for Ellsworth, Me., with coal, was wrecked on Saturday near the entrance to Fox Island Thoroughfare. She filled with the tide and promises to be a total loss. The Whitney was built at Ellsworth in 1895 and registered 217 gross tons.

Captain Macbeth and his crew of 24 men were rescued from the stranded Clyde liner Chippewa, off Montauk Point last Saturday night, when the vessel showed signs of breaking up in a heavy blow which sprung up unexpectedly, the rescuing party being local fishermen and visiting automobilists. The pumping apparatus of the wrecking company at work trying to float the Chippewa was carried away and the chances of saving the vessel are very slight.

The Independent Pneumatic Tool Co., First National Bank building, Chicago, Ill., announces that it is increasing its force of workmen at its plant at Aurora which would seem to indicate a revival in business. The company has received more orders for Thor pneumatic tools and appliances than at any similar period since last October.

## GOVERNMENT WORK FOR THE RACINE BOAT MFG. CO.

The Racine Boat Manufacturing Company, of Muskegon, Mich., is now preparing to begin the construction of three 60 ft. wooden steamers for the war department on contracts which have recently been awarded them. These crafts are intended for general harbor service in the Quartermaster General's department and are to be built in strict accordance with the plans and printed specifications furnished by the government. In appearance these steamers will be rather high-sided, weatherly looking craft, evidently designed for service pure and simple. No attempt has been made to secure either great speed or elaborate accommodations, although the contract calls for a normal speed of ten statute miles per hour, and cabins have been provided for both officers and men. The specifications call for first-class sea-going steamers, 60 ft. long, 13 ft. beam and 5 ft. draught. Amidships a 30 ft. deckhouse is located, encasing the engines and boilers, which are surrounded by coal bunkers. In the after end of this deckhouse is an officer's cabin, 13 ft. long, which is fitted with transoms and upholstered in leather. Here, as elsewhere throughout the boat, the interior finish is to be of polished cherry with beveled panels. At the forward end of this cabin is a toilet room. Forward of the main deckhouse is a raised pilot house, 7 ft. 6 in. wide and 9 ft. long, equipped with the usual pilot house controls. Especially heavy Sampson posts and towing bitts are provided at bow and stern, as considerable is expected of these vessels in the way of towing heavy targets for artillery practice, etc. Motive power of these steamers is to be provided by both high and low pressure R. H. vertical, direct acting, compound surface condensing engines. Steam is supplied by a water-tube boiler, 6 ft. 3 in. long, 5 ft. wide and 6 ft. 6 in. high, with a normal working pressure of 175 pounds to the square inch. The four-bladed propeller is 4 ft. in diameter and of 5 ft. 4 in. pitch, and is of manganese bronze. The deck aft is covered by a permanent awning and is provided with bulwarks all the way, fore and aft. Entrance to the cabins is effected by companionways in the main deck house, and also by a cargo hatch just forward the pilot house. These craft are of particularly heavy and substantial construction, being built practically throughout of solid white oak and yellow pine. The keel and frames are white oak, the former 7 in. by 7½ in. and the latter 2½ in. by 2½ in., flaring to 4 in. at the floors, spaced 12 in. apart. Planking is of 1¾ in. yellow pine.



**QUESTIONS FOR WHEELSMEN AND WATCHMEN.**

551. What is there about Big Pt. Sable lighthouse tower that differs from others?

552. Where is Big Pt. Sable light located?

553. What is the general appearance of the coast in that locality?

554. Where is Little Pt. Sable and how is it marked?

555. Give a general description of the land between Ludington and Pt. Betsie.

556. What is the appearance of the coast between White Lake and Little Pt. Sable?

557. How close can the east shore of Lake Michigan be approached with safety?

558. Name all the coast lighthouses on the east shore of Lake Michigan?

559. Between which points on the west and east shore is Lake Michigan the widest?

560. Where is it the narrowest?

**ANSWERS.**

541. Chicago Harbor, Sturgeon Bay Canal and North Manitou Island lights.

542. Nine islands.

543. Beaver Island, Garden Island, Hog Island, Hat Island, High Island, Gull Island, Squaw Island, Whiskey Island, Trout Island.

544. Garden Island is north of Beaver Island; Hog Island is east of Garden Island and Hat Island is NE of Hog Island; High Island is west of Beaver Island and Gull Island is west of High Island; Trout Island is north of High Island; Squaw Island is NW of Garden Island and Whiskey Island is south of Squaw Island.

545. Grays Reef is the eastern extremity of the rocky shoal extending eastward from Hog Island. It is some 8 miles in length.

546. Is wooded and bordered by bluffs. The island is about 13 miles in length, the eastern portion running about north and south and the south-eastern portion running about NE and SW. The west side of the island is of the same general appearance as the east side except that it is much higher.

547. On the bluff at about the middle of the south side of the island.

548. High bluff and woods.

549. Good; channel about 9 miles wide.

550. Located about 8 miles W by S from Beaver Island lighthouse. Least water 26 ft. It is not marked.

**QUESTIONS FOR MASTERS AND MATES.—NO. 6.**

86. What is a lodestone?

87. What is the natural magnet?

88. What kind of a magnet is the magnet of the compass?

89. In which direction does the magnetic needle point and to where does it point?

90. Do all magnetic needles point the same place and at the same time?

91. What kind of iron is soft iron? What is its magnetic condition?

92. What is hard steel? What is its condition magnetically?

93. Does soft iron retain its magnetism?

94. Does hard iron retain its magnetism?

95. What is induced magnetism, or magnetism by induction?

96. What are the different methods of making magnets?

97. How would you go about it to make a magnet for yourself?

98. In magnetizing a needle by the method of single touch, how do you know which is the north or south end of the magnet that received the rubbing?

99. Supposing you wanted the eye-end of a needle to be north pole, and the point the south pole, which end of the rubbing magnet would you employ?

100. How do you determine the north and south poles of a magnet?

**ANSWERS TO QUESTIONS FOR MASTERS AND MATES.—NO. 6.**

86. A mineral closely related to iron ore and possessing magnetic force.

87. A lodestone or one possessing natural magnetism.

88. An artificial magnet.

89. Magnetic north and south. To the magnetic poles.

90. Yes, if affected only by the earth's magnetism.

91. Cast or wrought iron. It becomes instantly magnetized to its full capacity when exposed to the influence of a permanent magnet but loses its magnetism instantly when the influencing magnet is removed.

92. Tempered steel. Its magnetic character is permanent and it will not reverse its poles, as soft iron does, no matter in what position it may be held. It receives its magnetism reluctantly but holds it permanently.

93. No.

94. Yes.

95. The magnetism imparted to a piece of iron by a magnet in its vicinity or brought in contact with it. The communication of magnetism from

the earth to the hulls of iron and steel ships.

96. By contact with an electric coil or dynamo; by induction from a permanent magnet.

97. Lay a steel bar flat on the table and rub it several times from one end to the other with one pole of a permanent magnet held vertically. Then turn the bar over and rub the other side with the same pole of the magnet, always rubbing in the same direction.

98. Rub from the center to one end and that end is of opposite name to the pole of the rubbing magnet.

99. Rub from the center to the eye of the needle with the S pole of the magnet.

100. By the attraction or repulsion manifested by it when brought into contact with the known pole of another magnet.

**BIDS FOR MINE-PLANTING VESSELS.**

The bids opened by the navy department recently for the construction of four mine-planting vessels resulted in the award of contract to the Pusey & Jones Co., Wilmington, Del., for the construction of one of the vessels and to the New York Shipbuilding Co., Camden, N. J., for the remaining three. The bids received were as follows: Union Iron Works, San Francisco, \$770,500; the fourth vessel to be delivered December 1, 1909. Newport News Company, \$686,000, the fourth vessel to be delivered July 1, 1909. Maryland Steel Company, Sparrow's Point, \$678,000, final delivery to be made May 3, 1909. Fore River Shipbuilding Company, \$745,000, final delivery June 14, 1909. William Cramp & Sons Company, \$659,000, final delivery July 28, 1909; New York Shipbuilding Company, the same as the Cramps' bid. Other yards bidding for one or two vessels were the Gas Engine and Power Works, Morris Heights, N. Y., John H. Dialogue & Son, Camden, N. J., The Pusey & Jones Company, Wilmington, Del., United Engineering Company, San Francisco, and Willamette Iron Works and Steel Company, Portland, Ore.

Arrangements are now being made for the building of two additional battleships for the Japanese navy, the keel for one of which is to be laid this month at Yokosuke. The other will be commenced at Kure before the end of the year. These vessels are to be of 28,000 tons displacement, of 20 knots speed, and they will have 12-in. armor. Their principal armament will consist of 12 12-in. guns.

## SHIP YARD NOTES.

The Mengel Box Co., Louisville, Ky., is building a towboat to be 150 ft. in length, 30 ft. beam and 4¾ ft. deep.

Brown's Ship Yard, Tottenville, S. I., N. Y., has the tug William J. Conway, building for Conway & Fox, of New York, almost ready for launching.

The Erie Basin Dry Dock Co., Brooklyn, N. Y., is having a large new balance dry dock built for it by Harry Cossey, at Tottenville, S. I., N. Y.

The Ohio River Sand Co., Louisville, Ky., is building a new hull for its towboat, William Duffy, which is to be 150 ft. long, 24 ft. beam and 4 ft. deep.

John H. Dialogue & Son, Camden, N. J., have delivered the new tug Sarah E. McWilliams to her owners, the McWilliams Transportation Co., of New York.

The Union Iron Works, San Francisco, Cal., have been awarded contract by the quartermaster department for constructing three 60-ft. wooden steamers at \$68,795.

Kruse & Banks, North Bend, Ore., recently launched the 12-knot twin-screw gasoline schooner Wilhelmina, which is building for the North Bend Navigation Co., North Bend.

The Harlan & Hollingsworth Corp., Wilmington, Del., recently launched a floating elevator for the Girard Point Storage Co., of Philadelphia, which has an hourly capacity of 10,000 bushels.

John Bishop, Vincent Point, Gloucester, Mass., has begun work on two knockabouts to be fitted with gasoline auxiliary power. One is for Thomas A. Cromwell and the other for Baker, Boise & Watson, T Wharf, Boston, Mass.

The Moran Co., Seattle, Wash., launched the new steamer Riverside July 11. She is building for the Charles Nelson Co., San Francisco, Cal., is 241 ft. long, with a beam of 41 ft. and will have a freight carrying capacity of 2,500 tons.

The Canton Boiler & Engineering Co., Canton, O., has been awarded contract by the bureau of yards and docks, navy department, for the construction of two steel floats for use at Newport, Ky.

The Harlan & Hollingsworth Corp., Wilmington, Del., has been awarded contract by the Central railroad of New Jersey for the construction of four large steel steam lighters for use

in New York harbor. They are to be of the most modern type.

The New York Shipbuilding Co., Camden, N. J., was the lowest bidder for the construction of four mine-planting vessels for which the quartermaster general opened bids at Washington recently. This company's bid was \$164,775 for each vessel.

The steel three-masted schooner James William was launched at the New Glasgow, N. S., ship yard July 14. She is owned by Carmichael & Co., Halifax, N. S., and is the first steel sailing vessel to be built in the Canadian maritime provinces.

William E. Woodall & Co., Baltimore, Md., are engaged in renewing all the timbers of the Baltimore, Chesapeake & Atlantic Co.'s steamer Choptank. When the repairs are completed her hull will be almost entirely new.

The Pusey & Jones Co., Wilmington, Del., has completed a shallow draft steamer for the Isthmian Canal Commission. She is known as the wheelbarrow type and after erecting her she has been carefully marked and taken down for shipment to the Isthmus in knockdown condition.

The Merrill-Stevens Engineering Co., Jacksonville, Fla., has received a contract for lengthening the government dredge and snagboat Florida 21 ft. on its bid of \$10,000. The Florida was built by the same company in 1894 and she is now 154 ft. long, 30 ft. beam and 7½ ft. deep.

The Newport News Ship Building & Dry Dock Co., Newport News, Va., turned the new armored cruiser Montana, which it had recently completed, over to the government July 10 at the Norfolk navy yard. This vessel is soon to be commissioned and will be in command of Capt. Reynolds.

The steamship Victoria, of the Northwestern Steamship Co.'s fleet, has been put in dry dock at the Puget Sound navy yard, where it was found that she had 20 beams broken and several plates cracked, as well as some injuries to her steering gear, all of which were sustained in bucking the ice at Nome.

The Moran Co., Seattle, Wash., has the new steamer Riverside, building for the Charles Nelson Co., of San Francisco, almost completed and it is expected that she will be ready to go into commission about the middle of August, plying between San Francisco and Puget Sound. The Riverside is a duplicate of the Stanley Dollar and Falcon recently constructed at the same yard.

Cobb, Butler & Co., Thomaston, Me., are to launch the four-masted schooner Jennie A. Bishop today. She is the latest addition to the fleet of the Benedict-Manson Marine Co., of New Haven, Conn., and is considered the finest lumber vessel on the Atlantic coast. She will ply between the West Indies and Atlantic coast ports. The cost of the vessel is \$70,000 and she has a capacity of 700,000 ft. of lumber. The Bishop is 175 ft. long and 40 ft. beam.

Sloane Bros., Seattle, Wash., have launched the car ferry barge which they are building for the Victoria & Sidney Railway & Ferry Co., a Canadian corporation which is a subsidiary of the Great Northern Railway. The owners are now at a loss to know what to do with the craft in view of the recent decision to exclude American vessels from the Canadian coastwise trade. At any rate the shipbuilders will have to pay duty on her. The new ferry is 160 ft. long, 32 ft. beam and 10 ft. deep and has a capacity of six cars.

The Metaline Navigation Co., Newport, Wash., is building a fast little steamer of 125 tons to operate on the Pen d'Oreille river between Metaline and Newport. The new boat is 113 ft. long on the water line and 126 ft. over all and is especially constructed for operating through Box canyon, a turbulent piece of water along the proposed route. The vessel has been built primarily to take care of the concentrates of the Metaline mining district but she is also being fitted with excellent passenger accommodations.

The Portland Ship Building Co., Portland, Ore., recently launched the steamer Shaver, building for the Shaver Transportation Co., also of Portland. The steamer is to operate as a towboat on the Columbia and Willamette rivers and is 155 ft. long, 30 ft. beam and 6 ft. deep. The machinery of the Shaver was taken from the steamer J. M. Hannaford, which was formerly owned by the Northern Pacific Railway Co., and was in commission on the Upper Columbia and Snake rivers. The engines have a history. They were built at Cincinnati in early days and placed in a steamer which operated on the lower Mississippi before the civil war. The engines saw service in one packet and another until they finally fell into the hands of the railroad company and were shipped out to northern Idaho and placed in the steamer J. M. Hannaford.

## BALTIMORE'S NEW DOCK SYSTEM.

The *Baltimore Journal of Commerce* recently printed a series of instructive articles by Oscar F. Lackey, harbor engineer, for the city of Baltimore, in which he describes the efforts of that city to build up a new system of docks and wharves which should be commensurate with its importance as a port.

Mr. Lackey's article appears herewith:

Prior to the great conflagration of Feb. 7-8, 1904, the city of Baltimore owned but very little wharf property; the little that was owned by the city was in bad repair and brought but slight revenue.

Immediately following the fire the project of securing all of that property between Light street, Jones Falls, Pratt street and the Basin for a modern and up-to-date wharf system was widely discussed, and though the proposition met with much opposition it was finally approved, it being fully realized that the existing conditions in the harbor of Baltimore were entirely inadequate to meet the requirements of the commerce of today. Accordingly the city procured authority from the state under the \$6,000,000 Dock Loan to obtain by purchase or condemnation all property rights within the above named section, and to establish thereon a system of piers and docks suitable to the requirements.

The loan was voted and passed May 17, 1904, and an ordinance of the mayor and city council of Baltimore was approved Nov. 10, 1904, the Burnt District Commission being empowered to secure the property by purchase or condemnation, the construction of the piers and docks to be carried on under the supervision of the harbor board.

Following the passage of the dock loan, plans were drawn up for the new pier system, and the details of construction thoroughly gone into. The contemplated improvement embraced a system of six piers and five docks, and piers varying from 600 to 1,400 ft. in length, with a width of 200 ft., the docks to be 150 ft. wide, with a depth of 24 ft. mean low water.

After the property was secured by the Burnt District Commission, plans and specifications were prepared by the harbor board for piers 1, 2 and 3 and advertised accordingly. Bids were opened before the board of awards Feb. 7, 1906, for the construction of stone and timber bulkheads, to enclose and form piers 1, 2 and 3, and for certain other work, and the contract awarded to the Degnon Contracting Co., of New York City, at a price of \$460,000, they being the lowest bidders, the work to start March 1, 1906, and to be completed Sept. 15, 1907. On March 1, 1906, work was started on the new piers, the first pile being driven on pier No. 3 at Pratt and Gray streets. Most of this

work was low tide work, that is, piles were cut off at an elevation of 1 ft. below mean low tide. Owing to the numerous high tides during the year the harbor board extended the time for the completion of piers to June 1, 1908; the piers were completed April 10, of this year.

On April 25, 1906, bids were opened before the board of awards for the construction of stone and timber bulkheads to form the new south line of Pratt street, between Light street and West Falls avenue, contract being awarded to the Degnon Contracting Co., of New York City, the lowest bidders, at a price of \$125,000. This work was also completed on April 10, 1908.

The main channel from Fort Mcherry to B. & O. pier No. 8 is 30 ft. in depth and from there to Boyce's pier it is 27 ft. in depth. The harbor board this year will dredge the present 24 ft. channel which runs from Boyce's pier to foot of Wills street to a depth of 27 ft., and the 20 ft. channel which runs from Wills street to Light street will be dredged to a depth of 24 ft. In other words, this makes the new piers 1, 2 and 3 available for vessels of 24 ft. draft, where formerly vessels of a greater draft than 18 ft. could not come further up the harbor than to the foot of West Falls avenue.

Piers 1, 2 and 3 are of pile and timber construction, to an elevation of 6 ft. above mean low water. In every other bent there are five piles, and between these short bents of two piles each. These piles are cut off 1 ft. below mean low water and capped longitudinally with 12 by 12 ft. timbers, on top of which, at right angles to same, are placed 12 by 12 cross caps let down 3 in. in each. On top of the last timber is placed a 6 by 12 ft. floor running back as far as the 6 by 12 ft. sheet piling. The sheet piling is driven back of the fourth longitudinal cap, penetrating to a depth of not less than 26 ft. below mean low water.

On the floor and over the first two rows of piles a masonry wall is built to an elevation of 6 ft. above mean low water and the pier filled in from wall to wall, making a solid pier. These piers, having been built on the site of the old piers, with the exception of the southwest corner of Pier No. 1, little filling was required.

After Pier 3 was partly completed, work being carried on from Pier 3 west, it was deemed advisable to reinforce and tie back the bulkhead to prevent bulging. This was done by driving additional piles back, in shore, and tying the original construction to them with 10 by 12 ft. timber, and placing rods, ends upset. In addition the original wall is backed with two feet of concrete.

The south end of the new piers is

north of the old south line, widening the harbor at pier 3 150 ft.

These piers are designed for the bay and fruit trade, the maximum draught of these vessels being 20 ft. It is not thought advisable to construct piers to accommodate vessels of heavy draught when the width of the harbor was so narrow. They can, however, care for the vessels drawing 24 ft.

At the same time the piers were under construction Pratt street (which borders on the water front) was being widened by the city engineer's department from 60 to 120 feet, starting at Light street and extending to Jones Falls, and a little later work was started on the widening of Light street south from Pratt street to Lee street. The cost of widening these streets was taken out of the \$6,000,000 Dock Loan. These piers are leased from the city for a term of 50 years, being revalued upon the expiration of every recurring period of 10 years.

Pier No. 3 is leased by the Merchants & Miners' Transportation Co. On Pier No. 2 the Standard Oil Co. has 100 ft. south of Pratt street on the west side. The Atlantic Fruit Co. has on the west side 256 ft. north from the south end. On the east side the Lanasa & Goffe Co. has 275 feet north from the south end. The remainder of this pier has not been leased, it being the intention of the city to hold it to relieve the congestion during the construction of piers 4, 5 and 6.

The east half of Pier No. 1 is leased by the United Fruit Co., and the west half by the Baltimore, Chesapeake & Atlantic Railway Co.

The piers rent for 36 cents per square foot, except the west side of Pier No. 1, which, owing to the greater area of water space, rents for 40 cents. All buildings and streets on piers are constructed by the lessees of piers, subject to the approval of the harbor board and the building inspector, all improvements to be insured during the term of grant at the expense of the lessee, and at the expiration of the grant all improvements shall become the property of the city.

Areas of piers are as follows: Pier No. 3, 153,166 sq. ft., at 36 cents, \$55,139.76; pier No. 2, 127,265.5 sq. ft., at 36 cents, \$45,815.58; pier No. 1, east side, 41,904 sq. ft., at 36 cents, \$15,085.44; pier No. 1, west side, 40,284.4 sq. ft., at 40 cents, \$16,113.76.

Total area, 362,619.9 square feet.

Total revenue per year, \$132,154.54.

David W. Ross, who was for some time general purchasing agent of the Isthmian canal commission, has recently been appointed vice president in charge of supplies and contracts of the Interborough Rapid Transit Co., of New York.

**BOSTON MARINE NOTES.**

Boston, July 22.—The Boston and Cuba Steamship Co., with offices in the board of trade building, will send its first steamship out of this port on July 31. It will be the *Talisman*, a namesake of Sir Walter Scott's famous novel. The *Talisman* is a ship of Norwegian register, which has of late been engaged in making trips between Bolivar and New York. Already a large number of important shippers have signified their intention of patronizing the new line and although at present sailings will be made but once a month they will occur more frequently as soon as the business of the line warrants the addition of extra steamers. The Boston & Cuban Steamship Co. is operating under a charter from the state of Massachusetts. Patterson, Wyld & Co., are the freight agents for the line in Boston, while at Havana the new line is represented by A. J. Martinez who will give every assistance possible to shippers and exporters.

Hon. Lloyd E. Chamberlin, Richard L. Gay and Walstein R. Chester, representing the Massachusetts board of trade have gone abroad and will visit various places in Great Britain and on the continent to obtain data and get suggestions to be used in the construction of the Cape Cod ship canal.

Exports for the port of Boston for the week ending July 10 showed a decided decrease. In value they amounted to \$844,806 for the week, as compared with \$2,036,012 for the same week of last year. Somewhat of an increase was shown in imports as they amount to \$1,988,152 for the week ending July 10 of this year as against \$1,710,102 for the corresponding week of 1907.

The \$1,250,000 turbine steamship *Creole* of the Morgan line, operated by the Southern Pacific Steamship Co., will return to the works of her builders, the Fore River Ship Building Co., where a new forced draft system will be installed, the pitch of her propellers changed, and equipped for burning oil for fuel instead of coal. The *Creole* is equipped with two Curtis (Fore River) reversible marine steam turbines such as are in use on the record-breaking scout cruiser *Salem* built by the same company, and although the *Creole's* speed is in excess of contract requirements it is thought that with the changes contemplated the speed will be considerably increased.

**RACE ON IN BATTLESHIP CONSTRUCTION.**

The naval constructors at the New York navy yard who are to have the supervision of the construction of the 20,000-ton battleship *Florida* have the preliminary work well under way and within a few weeks the navy department will ask for bids for material needed for the vessel. There is every indication that there will be keen rivalry between the navy yard and the private ship building company which is to build the sister ship *Utah*. Both vessels are expected to be complete in two and a half years.

Naval Constructor William J. Baxter, who built the *Connecticut*, will be at the head of the government force and will be assisted by Naval Constructor W. G. Groesbeck, U. S. N.

The *Florida* and *Utah* are to be "all big gun" battleships, that is, the guns are to be 12-in. They will be mounted two to a turret, and so arranged as to have an arc of fire unapproached in modern naval construction. They will be fitted also with the new type of skeleton military masts. In addition to this great battery the ships will carry a secondary battery of about 20 five-inch rifles.

**AVONMOUTH'S NEW DOCK.**

The Royal Edward Dock at Avonmouth, England, was formally opened by King Edward on July 9, the opening being accompanied by appropriate ceremonies.

The new dock, which has been constructed entirely by the enterprise of the Bristol Corporation is connected by a passage with the older Avonmouth Dock, which was opened in 1877, but it is situated nearer to King road, on the River Severn, from which it is approached without entering the River Avon. As in the case of the older dock, that which has now been constructed consists of a large basin 1,000 ft. wide by 1,120 ft. long. At the south-eastern angle is a branch 500 ft. long and 250 ft. wide, at the end of which is a passage 85 ft. wide, connecting the new dock with the older one. The water area of the large basin and the south-eastern branch is about 30 acres, and the quay walls are 4,200 ft. in length. In addition to this accommodation, the dock has been designed and the walls have been built to admit of extending the water area by nearly 25 acres, and the length of quayage by 7,800 ft., at a comparatively small cost, by the construction of two more branches at the northern end of the dock, each 1,800 ft. long and 300 ft. wide.

Opening out of the Royal Edward Dock, on the northern side, there is a dry dock 850 ft. in length and 100 ft. wide at the entrance. The dock is closed by three pairs of gates, and the water level

is controlled by sluices. The gates are protected from collision with vessels by fender chains, which can be hauled across the lock. The whole of the machinery for the gates, the sluices, and the fender chains is worked by hydraulic pressure.

When a vessel has to be dry-docked the water is pumped out of the dock by steam-driven, centrifugal pumps, capable of completely emptying the dock in 2½ hours. As no water flows into the Royal Edward Dock, except from the tide, and as the neap tides do not rise to the normal dock level, the dry dock pumps are so arranged that they can be used during neap tides to pump water from the Channel into the dock to replace that which is let out and lost in the operation of passing vessels in and out through the entrance lock. The equipment of the dock includes transit sheds and cranes, a granary and machinery for transporting grain from the ship and lifting it into the granary from the railroad sidings. On each quay there is a large railway yard for the interchange of traffic with the railway companies. A railway station is to be built near the South Pier, so that passengers may be taken by train direct to and from the steamers. Water and gas pipes are laid, and numerous hydrants are provided for extinguishing fire and for supplying fresh water to shipping. The sheds and quays are lighted by electricity, and electricity is employed to drive the cranes and the grain machinery. The electric current is generated in Bristol, and is conveyed about eight miles to Avonmouth. There are at present completed two double story sheds on the east side of the dock, each 500 ft. long, designed for import cargoes, and there is also one single-floor shed on the south side, designed for export cargo. On the roof of each of the double story sheds there will be six electric cranes, and on the wharf in front of the single-floor shed there will be five electric cranes.

Adjoining the dock there is a large area of land, which, after reserving sufficient for extensions of the dock, is available for the erection of factories, thus affording the great advantage to manufacturers of easy access both to shipping and to the railways for the reception of raw materials and for the distribution of their products.

Capt. Herbert Winslow, U. S. N., of Boston, has been selected by the navy department to be the new executive officer at the Charlestown navy yard, succeeding Commodore George H. Peters, retired. Capt. Winslow, who has been in charge of the naval recruiting station at Boston, is a son of Rear Admiral John A. Winslow, of Kearsarge-Alabama fame.



## SUMMARY OF NAVAL CONSTRUCTION.

Name of Vessel.	Building at—	—1908—	
		Per cent of completion. June 1.	July 1.
BATTLESHIPS.			
South Carolina .....	Wm. Cramp & Sons.....	49.0	51.9
Michigan .....	New York S. B. Co.....	53.0	57.2
Delaware.....	Newport News S. B. Co.....	27.4	31.6
North Dakota .....	Fore River S. B. Co.....	35.7	40.5
ARMORED CRUISERS.			
Montana .....	Newport News S. B. Co.....	98.8	*99.2
SCOUT CRUISERS.			
Salem.....	Fore River S. B. Co.....	97.1	98.9
TORPEDO BOAT DESTROYERS.			
T. B. Destroyer No. 17.....	Wm. Cramp & Sons.....	21.3	31.1
T. B. Destroyer No. 18.....	Wm. Cramp & Sons.....	19.7	26.9
T. B. Destroyer No. 19.....	New York S. B. Co.....	22.4	33.8
T. B. Destroyer No. 20.....	Bath Iron Works.....	11.5	13.0
T. B. Destroyer No. 21.....	Bath Iron Works.....	10.9	13.0
SUBMARINE TORPEDO BOATS.			
Submarine T. B. No. 13.....	Fore River S. B. Co.....	45.3	49.3
Submarine T. B. No. 14.....	Fore River S. B. Co.....	45.2	49.4
Submarine T. B. No. 15.....	Fore River S. B. Co.....	44.9	48.6
Submarine T. B. No. 16.....	Fore River S. B. Co.....	45.1	48.8
Submarine T. B. No. 17.....	Fore River S. B. Co.....	27.5	35.8
Submarine T. B. No. 18.....	Fore River S. B. Co.....	23.1	32.6
Submarine T. B. No. 19.....	Fore River S. B. Co.....	23.1	31.7
COLLIERS.			
Vestal .....	Navy Yard, New York.....	85.2	89.1
Prometheus .....	Navy Yard, Mare Island.....	59.3	66.8
TUG BOATS.			
Patapsco .....	Navy Yard, Portsmouth.....	70.0	75.0
Patuxent .....	Navy Yard, Norfolk.....	65.7	72.2

\*Delivered at Navy Yard, Norfolk, July 10, 1908.

## ANNUAL MEETING OF JOHN BROWN &amp; CO.

The annual meeting of shareholders of John Brown & Co. was held at Sheffield recently, Sir Charles McLaren, M. P., chairman, presiding over a good attendance.

In proposing the adoption of the report, which recommended a final dividend making 10 per cent for the year, the chairman said there had been considerable variations in the general trade of the country during the past year. Operations had been fairly satisfactory at their works in Sheffield. The demand for railway material had kept up fairly well, but owing to the difficulty on the North East Coast in the shipbuilding yards the demand for their special steel products, so largely used in shipbuilding, had not been sustained. How long the shipbuilding depression would last no one could say. As manufacturers of these products they could only lay themselves out to take advantage of improvement when it came. He was glad to say that notwithstanding the depression, they were still doing a large amount of business in their forge and boiler flue work, particularly in connection with the new Orient liners, contracts for which had been placed at various yards, and one of which was in hand at Clydebank. He referred last year to extensions and alterations in the works which they were making to cope

with changes in manufacture. These were now nearly completed, but they could not give any pledge that they would not be compelled to spend more money from time to time in similar work. The new armor plate mill was now at work, and was engaged upon a large order for the battleship St. Vincent, now being built at Portsmouth.

Turning to Clydebank, the work in hand last year had been got well forward, and had given full satisfaction. The great success of the Lusitania, whose trial trip they referred to at their last meeting, had been a matter of public knowledge. She had now fully complied with every one of her contract requirements, including speed, and she had never been really pushed to give results beyond what were needed for her practical work. There could be no doubt that the vessel had been an enormous and unqualified success from every point of view, and he desired to express his recognition of the ability and energy which had been shown at Clydebank in her design and construction. The inflexible, one of the powerful, swift armored cruisers, had completed the whole of her trials with the utmost success. The mere fact that she was the swiftest war vessel of a large size ever put into the water was a justification of the policy of the Admiralty in designing that class of boat. It was perfectly clear that they could now turn out a heavily-

armored and heavily-armed 26-knot warship without the slightest difficulty, and that John Brown & Co. should be one of the firms selected to build this new type of cruiser-battleship must reflect very great credit on the enterprise and capacity of their officials. Not only were the various contract requirements exceeded, but the whole trials, lasting over three weeks, were completed actually within one hour of the time laid down in the official program. That constituted a world's record in a battleship.

He was sorry to say that in mercantile shipbuilding the prospects were anything but good. They hoped, of course, that having regard to the fact that no vessels had been laid down for more than twelve months in the shipping trade as a whole, shipowners might come into the market when they saw the prices of material lower. Looking back over the ten years that they had owned the yard at Clydebank, he did not think any shareholder would say they did not do a wise thing when they acquired it. The success of the Carmania, the Caronia, and now the Lusitania plainly showed that they were at the very head of the mercantile ship-building world. There was no vessel they could not build, and no orders that came into the market that they would not get a full share of.

They had had labor troubles, but he hoped they were practically at an end. One bright feature was that the depression in shipbuilding did not seem to have affected Harland & Wolff at Belfast, and, in view of the large interest acquired by the company in that concern, it could be considered that when Harland & Wolff were doing well they were doing well also.

The report was adopted, and the retiring directors re-elected.

## NEWSPAPERS ON THE YALE AND HARVARD.

The publication of a bijou paper on the Yale and Harvard is the latest innovation on those great ships. This publication, entitled the "Acrogram," is published nightly on the steamers.

The United Wireless Telegraph Co., who operate the wireless service on the Yale and Harvard, under an arrangement made with one of the New York news companies, provide the base ball returns, racing results, and important news items which materialize after the steamers leave New York and Boston, this being printed by a duplicating process. Later on it is expected that a regular printing establishment will be utilized in connection with the publication.

## THE FURTHER IMPROVEMENT OF OUR INLAND WATER- WAYS.\*

BY MAJOR C. S. RICHE.

For many years it was the fashion to ridicule the government's work of river improvement.

While our rivers, so far as naturally navigable, were the highways for the exploration and early settlement of the country, the invention of the railway, and its rapid extension in all directions, soon drew the traffic from the rivers, and the convenience and celerity of the railway as a means of transportation made many believe that river-borne commerce was a thing of the past.

So long as the volume of freight to be moved remained within certain limits, the railways could handle it advantageously; but the volume of freight kept increasing with the increase in density of the population, and the railways have found themselves more and more taxed to take care of the business that was offered them.

The development of railway transportation since the year 1880 has never been equalled, yet all admit that this development has lagged far behind the increase in our farm products, in the volume of factory productions, in the output of mines, forges, steel and iron mills, and in the enormous increase in our live stock and other industries of the nation. Our domestic and foreign commerce have increased in the last decade so that our railway systems have become admittedly and grossly inadequate for the successful handling of commodities—In their equipment, in their trackage, and in their terminal facilities. One cause of this condition is the unexampled growth in our population.

In 1890 the United States proper had a population of 62,622,250; in 1900, 76,303,387, and it is safe to say from the present rate of increase that the 1910 census will show 95,000,000.

It is conservatively estimated that our population, native and foreign, increases each year 2,000,000.

The improvement in recent years of farm and manufacturing machinery and appliances has quadrupled the capacity of labor, and the inventive genius of the American people has not yet been exhausted. Other improvements will come in the future as in the past.

In 1890 the value of the farm

products of the United States, not including live stock, was \$2,460,170,454; in 1900, \$4,739,118,752, an increase in 10 years of approximately 100 per cent. The secretary of agriculture in his annual report for the year ending Dec. 31, 1906, gives a total value of \$6,974,000,000, an increase in 15 years of approximately 300 per cent.

The bulk of this increase in farm products has been in the west, south, and southwest. It is a matter of familiar knowledge that until recent years the live stock of the southwest, seeking a market, were driven on foot. Now almost universally they are shipped by rail.

In 1890 the value of the manufactured products of the United States was \$9,372,378,384; in 1900, \$13,010,036,514; in 1905 it is officially stated that it reached \$14,808,147,089, an increase in 15 years of approximately 60 per cent.

The present period of depression is but a temporary set-back—a breathing spell—and will assuredly be followed by a still greater development of all our industries.

The capacity of our railways is seriously taxed to meet the requirements of this commerce, and the vast extent of this rapidly growing traffic is one cause of the congestion which has confronted the railways. Eminent railway experts state authoritatively that it will require an expenditure of over \$1,000,000,000, five years of time, and the services of 200,000 additional men to render the railways of the United States adequate to the handling of our commerce as it exists today. They further state that while the money might be obtained, the additional labor cannot. In the last 10 years our industries have increased in output fully 100 per cent. During the same period the railways have increased their equipment and facilities for handling the internal and foreign commerce of the United States about 40 per cent.

The inability of our railway systems to handle the great and growing traffic of the country has caused attention to be again directed to the inland waterways as a means of increasing our transportation facilities. The energetic interest of President Roosevelt has been enlisted, and he has appointed a commission of distinguished membership to consider and report upon the entire question.

The problem which presses for solution is to devise ways and means of transportation which will carry the

commerce, relieve the destructive freight congestion, and supply transportation facilities more adequate to our needs. The United States is favored with numerous rivers, most of which can be improved to a navigable condition.

Improved waterways will not only be an effective assistance in the transportation of our commerce, but will also be a most potent regulator of railway traffic in all territory within the sphere of their influence, and by their very nature will accommodate an increasing traffic and afford effective facilities ever ready for taking care of the additional commerce which is sure to arise in the future.

It has been amply shown by experience that the lowering of freight rates by water competition, so far from injuring the railways affected, will greatly benefit them by reason of the increased volume of traffic that is and will be created by the certainty of lower rates.

To improve thoroughly the waterways throughout the great extent of our country will involve a large expenditure. To gridiron the United States with waterways, as has been done very largely in continental Europe, will require time and money. Nevertheless, if we are to support a population approximating in density that of Europe, if we are to get our freight carried at reasonable rates from point to point within our borders, and from interior points to the seaboard, where we must meet the competition of the world, interior lines of water communication must be developed.

Looking at the problem as it presents itself today, the most significant fact about our existing waterways seems to be their lack of continuity. The great lakes, and the Mississippi with its tributaries, each form great waterway systems, but they lack direct and adequate connection. In addition to these, we have a large number of detached rivers, boats on which are isolated and cannot get from one river to another, nor to either of the great systems above referred to.

The completion of the Panama canal will place us in direct water communication with the Orient. In the gulf states there are numerous rivers which empty into the sea and which can be made navigable during the entire year, as they are free from ice. The improvement of these rivers will regulate freight rates in all of that territory, will obviate freight

\*Read before the Contemporary Club, Davenport, Ia., March 19, 1908.

congestion, and put the gulf states, our cotton planters, wheat and grain growers, in direct and easy communication through the Panama canal with China, Japan, and all the commercial countries of Asia.

In former years the freight congestion, which closed the markets of the northwest, was relieved by building railways from Missouri points to the gulf coast in Texas, but such has been the agricultural and commercial development in recent years in western Kansas, Oklahoma, and Texas, that a destructive congestion exists in those states which demands relief—and this relief can be afforded by the improvement of such rivers in that section as can be made navigable.

A congestion of freight in one part of the country cannot now be met by a concentration of vessels to care for it. The railways can concentrate their rolling stock anywhere. Our waterways, as they now exist, lack a similar power.

A thorough remedy cannot quickly be applied, but a great start towards it can be made at comparatively small expense. One or more efficient waterway connections could be made between the lakes and the Mississippi. The cheapest can be made at Chicago by way of the Illinois river. The great railway systems which have their termini on the lakes could frequently find relief from freight congestion by way of and through the Illinois river.

In addition to this a coast canal system could be extended, making an efficient and sheltered waterway nearly all at sea level and connecting all the sounds, bays, and rivers from Boston to the Rio Grande with each other and with the Mississippi.

The above, with the new Erie canal, and with the St. Lawrence river improvements, would enable a boat on any river on our Atlantic and gulf watersheds to get to any other river. Isolated waterways, so far as these watersheds are concerned, would then be a thing of the past.

I am of opinion that this could be accomplished in from five to 10 years, at an annual expenditure within the amount appropriated and authorized by the last river and harbor act.

Supplementary to this, existing waterways should be improved in depth, etc., where necessary, and navigation extended by locks and dams where commercial conditions warrant. Ultimately, short lines of canal should be built where commerce justified

and where large savings in distance would result.

An adequate connection between the lakes and salt water is much to be desired. The new Erie canal being intended for barges alone, and being suitable for the local necessities of New York state, is felt by many to be a mistake from the national point of view. It is questionable if a ship canal of this length could be used economically by ships as a means of transporting freight; but the special conditions which surround lake traffic and which cause the enforced idleness of our lake fleet for five months every year, would seem to justify careful consideration. For not over 10 per cent increase in cost lake vessels could be made sufficiently seaworthy for general ocean service. If some means existed whereby such vessels could get to the ocean during the winter months, they could all be usefully employed to the exclusion of the English and German ships that crowd our Atlantic and gulf ports at the time when our great fleet of lake vessels is now lying idle.

If the new Erie canal could have its locks and such structures sufficiently enlarged and its depth slightly increased to permit these vessels to pass through it when light, it is possible that this work might go far towards rendering a ship subsidy unnecessary as a means of restoring the American flag to the high seas. It is possible, too, that the same result could be obtained by means of the lakes-to-the-gulf waterway from Chicago to the Mississippi, which is now under consideration.

The subject merits careful study, not alone for the reasons above stated, but for the further fact that our Canadian friends are earnestly considering the advisability of building a ship canal 22 ft. in depth from the lakes to Montreal by way of Lake Nipissing and the Ottawa river. Such a canal is estimated to cost not over \$75,000,000, which is less than the amount appropriated and authorized by our last river and harbor act, and would provide an all-British deep waterway from the lakes to salt water. Its construction would make the English tramp steamer as familiar a sight at Chicago and Duluth as it is now at New York, New Orleans and Galveston, and the supremacy of our lake marine might be seriously threatened. These considerations certainly justify careful study in connection with any plan for the future development of our great lake waterways.

The Pacific slope must be considered independently of the rest of the country. Here natural conditions are less favorable. With the exception of the Columbia and its tributaries, and the rivers flowing into San Francisco bay, it does not seem that any extensive systems of internal waterways can there be developed.

Where such a system of waterways can be developed, however, there should be a policy of standardization; just as the railways have adopted a standard gage and a standard clearance overhead and at the sides, so the waterway system should have standard depth, standard sizes of locks, and standard openings in bridges, etc. Such a standardization can be attained but gradually. Where depths are to be obtained by dredging or similar methods, a gradual increase can be had without waste. Where permanent structures such as locks and dams are to be built, however, they should be built to standard dimensions from the start to avoid any necessity for reconstruction.

The choice of standard dimensions for such structures is somewhat difficult. Locks on the Ohio, where large tows are used, must be wide and long. On other rivers this may be unnecessary or impracticable, but a boat of reasonable size should be able to go through any lock on the entire system, and locks of smaller size than the adopted minimum should not hereafter be built.

As for depth, 6 ft. would seem as small as should be adopted, and there are many arguments for 9 ft. Nine ft. has been attained on the lower Mississippi—is being attained on the canalized Ohio. Nine ft. appears to be the least depth on which can be floated a boat seaworthy enough for occasional lake and ocean service. Such depth would, therefore, give our internal waterways a much wider field of usefulness.

While states and localities should co-operate in the development of internal waterways, these waterways should be controlled, and preferably built and owned, by the United States. No other general course seems practicable, if our waterways are to be formed into a harmonious system.

When the benefits of the improved waterways will be principally local it may be that rights of way, easements, etc., for locks and dams and for canals should be furnished to the United States, free of charge by the states or localities particularly interested, and local authorities might be

required to build all highway bridges over artificial waterways. There is a tendency to force onerous requirements in such matters when the United States is to pay the cost, and such things can be attended to more economically by local interests. It may also be desirable that the United States should be given ownership and control of all water powers which its structures incidentally develop. The sale of such power privileges for a term of years would often go far towards paying for the work, and for the cost of maintenance.

It may be desirable that appropriations should be conditioned upon local authorities providing that wharves, landing places, and warehouses should not be monopolized, but kept available for all on equal terms, as the essence of a national waterway system lies in the impossibility of monopolizing it in whole or in part.

The above general considerations concern our waterways from the standpoint of navigation alone and without reference to their relation to the subjects of flood and low water prevention, irrigation, the national defense, etc.

With regard to these matters, that of irrigation seems furthest removed from navigation, so far as possible co-operation is concerned. As a rule territory requiring irrigation is far removed from navigable water. The great floods which occur in our navigable waterways come almost entirely from precipitation elsewhere than in the irrigation territory. The storage of water in this territory, therefore, will only in exceptional cases be likely to have any appreciable effect in lowering flood heights in the navigable portions of the river, and probably no effect in preventing extreme low water.

Water storage as a means of keeping river fluctuations within bounds is highly desirable, and should always be encouraged. Probably no better opportunity for such storage is offered than in the case of the Upper Mississippi river and its tributaries. The natural storage of water in the Watershed of the Upper Mississippi is very great. If all the lakes in this watershed were tinted blue on a large scale map, it would look as if they had been put on with a spatter-brush. As a consequence of this, the range of the Upper Mississippi between high and low water is relatively small, being from 12 to 22 ft. Could the discharge of the river be made constant, a permanent stage in water service and a practically permanent condition

of river bed would result. The improvement of the river for navigation would then become very simple. But such a state of affairs would be of great benefit, not merely to navigation and to agricultural and commercial interests along the river banks, but also to the great water powers that could be established on the main river at Des Moines rapids and at Rock Island rapids, as well as to all water powers on the tributaries of the river where the same conditions were fulfilled.

This result would be of great financial value to all such water powers. On a stream of fluctuating discharge, it is the low water flow that counts for water power. In many cases this is supplemented by pondage or storage of water immediately above the power plant—this stored water being used during the hours of heavy load and stored during the hours of light load; but such an arrangement will not have any appreciable effect on seasonal fluctuations in the river flow, and as a result most water power plants are limited in extent by the low-water flow of the river, and depend upon auxiliary steam plants to care for their business during the low-water period. Extreme high water, by flooding, and drowning out the dams, etc., also frequently causes interruption in water power service.

The production of a steady flow in a stream, therefore, becomes of very great value for water power purposes. It means the doing away with expensive auxiliary steam plants, and in many cases would permit water powers to be developed that otherwise would be financially impossible.

In the upper Mississippi watershed, if such artificial storage of water and regulation of its flow as could profitably be undertaken at the cost and in the direct interest of water power owners alone, were so undertaken, I am of the opinion that a very great improvement in navigable conditions would result in the main river as well as in many of its tributaries. Extreme floods would become less frequent, extreme low water would be prevented, and a great approach to a steady flow would be made. The injurious effect upon river flow of farm and swamp drainage and of the cutting off of the forests would be very much more than counteracted.

As a physical problem, there is no serious difficulty in bringing about such a result; nor would the cost of the work be excessive when compared with its value. A lake can be

used for storage of water without raising its surface above the level it naturally has at the wet time of the year. Regulating works can be so designed that the water of the lake may be drawn down instead of stored up. Flowage damages can thus be avoided, and while the owners of the riparian rights on the lake might claim damages for the occasional drawing down of the water, such damages, if obtained, would necessarily be far smaller in amount than would be damage for flowage, owing to raising the lake above its natural high water level.

The result that could thus be obtained with the upper Mississippi and its tributaries, so far as the physical work is concerned, may be difficult to provide for under present local, state, and national laws. It may be hard also to get the necessary co-operation among water power owners, but the resulting increase in wealth to the whole section of country concerned would seem to make an effort in this direction worth while.

### THE TIDES.

(Continued from July 16.)

Close investigation backs up the theory that the magnitude of the tidal range depends upon the proportion of the size of the lake or sea bears to the diameter of the earth; for instance, the existence of a tide in Lake Michigan has been proved by a series of observations made at Chicago in 1859. The average height, as has already been stated, is  $1\frac{3}{4}$  in.; and the average time of high water is 30 minutes after the moon's transit. The length of Lake Michigan is 350 miles, or  $\frac{1}{23}$  of the earth's diameter; and its tide is about  $\frac{1}{23}$  of that which prevails in mid-ocean. Again, the length of the Mediterranean is 2,400 miles, or, roughly,  $\frac{1}{3}$  the diameter of the earth, which gives the average height of its tide as  $\frac{1}{3}$  what it is in the open sea, and this is confirmed by observation.

The tide current, then, is caused by tide waves from the ocean being concentrated and checked by local formation, also by the frictional resistance offered by the bottom and sides of a narrow channel. In passing through contracted spaces, these waves, as already stated, are heaped up and urged on by the continued pressure of the water behind, whose motion is less retarded than that of their own; and thus, in seeking to find its level, an actual current is created.



The tide current, must not, however, be mixed up with the general ocean currents, which are progressive movements of the water, due partly to prevailing winds, and partly to differences of temperature and density, which, by disturbing the equilibrium, cause a constant circulation to be going on in the waters of the globe; and this, be it remembered, takes place in a vertical as well as a horizontal direction.

It is difficult to first realize that mere friction can play such an important part in connection with tidal currents, but unmistakable evidence of this is given in a variety of ways. Take for example where a winding channel has been straightened out by dredging its bed. The effect is to make a difference in the time of high water, bringing it about earlier than before.

The "equilibrium theory" assumes an ideal globe entirely covered with a frictionless ocean; but as our earth does not conform to this condition, and as the ocean is very far from being frictionless, the ideal tide, as we have seen, is not the tide that we actually know. As a matter of fact, theory does not always represent the tides of the ports of the world. Observation shows that the irregular distribution of land and water, and the variable depth of the ocean, in themselves alone produce an irregularity in the oscillation of the sea of such complexity that the rigorous solution of the problem is altogether beyond the power of analysis. Therefore, the tides of any given place cannot be predicted from a knowledge of the tides of any other place. Observation alone will do so, and in this form the problem is a simple one.

Here it is necessary to observe that, owing to a fluid-friction, the inertia of the water, and other causes, the tide wave is found to lag behind the moon, and on this account the highest tides do not occur when her influence is greatest, but from one to three days after. The tide corresponding to new or full moon, can however be detected by its superior height, which accordingly enables us to get at what is termed the retard or age of the tide. Its value is determined by taking the average interval between the moon's transit at full and change and the highest high water following it.

Similarly, high water at any place is not simultaneous with the moon's passage of the meridian of that place, but mostly occurs an hour or two after, indeed in some places there is

actually low water at the time of the moon's meridian passage; discrepancies are innumerable, and ports can be mentioned showing all the intermediate phases. If high water everywhere, at full and change, corresponded exactly with the time of meridian passage, there would be only one "Establishment of the Port," namely 12 hours; but the tide tables show that this is very far from being the case.

The tide wave is due not nearly so much to the actual horizontal transfer of a body of water from one place to another, as to an elevation of its surface. Thus the sun and the moon do not draw after them the mound of water which has been raised by their attraction, but are all the time engaged in raising the water which is vertically beneath them. As we have seen, the propagation of the tidal wave is compatible with immense velocity, whereas the tide current rarely exceeds five or six miles an hour. Were the tide wave one of translation, like the tide current, it would carry destruction in its course. The tide current is merely a reaction of the tide wave; it is those particles of water that are drawn along with the attraction for some distance before they are overcome by friction or by the molecular attraction of the water particles to which they belong. It seems almost incredible that it is only the water beneath the moon (or the attraction of moon and sun) that is elevated and set in motion; and that as soon as this attractive force has passed from directly over it, the raised portion descends from the spent force and gradually becomes depressed into a trough in obedience to the laws of equilibrium. The bottom of this trough is the low tide while the top of the tide wave is high water. The water in the

rear of the tide wave gradually runs into this trough to restore an equilibrium and this is when low water starts to rise. This filling in of the trough or depression of the tidal wave, causes the water in the rear of it to lower correspondingly. The water in the rear of the tidal wave gradually rises in restoring the equilibrium, which was disturbed by the advance of the tidal wave, until mean sea level is reached. It then begins to rise because there is another tidal wave advancing six hours away. It must be remembered that while the heaped up water directly beneath the attraction is the highest water at that time, high water is beginning to take place six hours in advance of this highest water, and the same thing is true with the lowering of the water.

The peculiar action of the tidal wave may be shown thus: Let two persons stand a few yards apart, each holding the end of a piece of rope stretched loosely between them. Now, if one were to shake the rope smartly in an up-and-down direction, undulations or waves would be caused in it, which would travel to the other end with great rapidity; nevertheless, from both ends being retained in the hands of the persons, the rope, taken as a whole, would occupy throughout the same position. In other words, it is not necessary for that end of the rope, where the undulation started, to follow up the undulation in order to transfer or communicate it to the other end. This is precisely the action of the tidal wave.

The shaking of a sail, or the fluttering of a flag, serve to illustrate the same effect, therefore we see that it is the form alone of the wave which moves, and not the water of which it is composed. In other words, the same wave as it advances is not composed of the same water.

#### BIDS FOR DAM, LEVISA FORK, BIG SANDY RIVER.

Abstract of proposals for constructing dam, guidewalls, dwellings, etc., at lock No. 1, Levisa Fork of Big Sandy River at Chapman, Ky., received in response to advertisement dated May 26, 1908, and opened June 26, 1908, by Lieut. Col. J. G. Warren, Corps of Engineers, U. S. A., at Cincinnati, Ohio:

Classification—	Approximate Quantities.	(1)		(2)	
		James Skene & Sons, St. Louis, Mo.		C. H. Fath & Son Construction Co., Cleveland, O.	
		Unit.	Total.	Unit.	Total.
Earth excavation .....	cu. yds. 40,000	\$ 0.75	\$ 30,000	\$ 1.25	\$ 50,000.00
Rock excavation .....	cu. yds. 4,500	3.00	13,500	1.85	8,325.00
Embankment .....	cu. yds. 4,300	0.35	1,505	0.60	2,580.00
Concrete .....	cu. yds. 7,250	5.00	36,250	4.50	32,625.00
Piling, round .....	lin. ft. 1,600	0.50	800	0.55	880.00
Timber .....	M. ft. B. M. 27,000	50.00	1,350	58.00	1,566.00
Lumber .....	M. ft. B. M. 26,000	80.00	2,080	98.00	2,548.00
Iron and steel .....	pounds 230,000	0.08	18,400	0.0825	18,975.00
Cement .....	barrels 7,700	1.50	11,550	1.65	12,705.00
Removing lock coffer .....	lump sum	.....	1,800	.....	2,200.00
Dwellings .....	number 3	2,317.00	6,951	3,000.00	9,000.00
Outbuildings .....	number 3	90.00	270	320.00	960.00
Cisterns .....	number 3	65.00	195	125.00	375.00
Office .....	number 1	.....	288	.....	375.00
Drains .....	lin. ft. 500	0.50	250	0.70	350.00
Skilled labor .....	hours 1,000	0.50	500	0.65	650.00
Unskilled labor .....	hours 2,000	0.25	500	0.30	600.00
Total .....			\$126,189		\$144,714.00

**Dredging in Duluth-Superior Harbor.**

Abstract of proposals for dredging in East Gate basin, Duluth-Superior Harbor, and opened at Duluth, Minn., by Major Graham D. Fitch, corps of engineers, June 23, 1908:

Name and address of bidder.	Per cu. yd. measured in place or in scows.
Duluth-Superior Dredging Co., Duluth, Minn. ....	12½c
Great Lakes Dredge & Dock Co., Duluth, Minn. ....	12½c
Northern Dredge & Dock Co., Duluth, Minn. ....	13c
*Zenith Dredge Co., Duluth, Minn. ....	12c

\*Accepted.

**Dredging in Duluth Harbor Basin.**

Abstract of proposals received for dredging in Duluth Harbor basin, Duluth-Superior Harbor, and opened at Duluth, Minn., at noon, June 30, 1908, by Major Graham D. Fitch, corps of engineers, U. S. Army. Amount proposed to be expended on this work, about \$180,000:

Name and address of bidder.	Per cu. yd. measured in place or in scows.
Northern Dredge & Dock Co., Duluth, Minn. ....	11½c
The Fitz Simons & Connell Co., Chicago, Ill. ....	12½c
Duluth-Superior Dredging Co., Duluth, Minn. ....	10½c
*Great Lakes Dredge & Dock Co., Chicago, Ill. ....	10½c
Zenith Dredge Co., Duluth, Minn. ....	11½c

\*Recommended for acceptance.

**Improving Harbor at Manistique, Mich.**

Abstract of proposals for building plank crib revetment, removing old pier, and dredging at Manistique Harbor, Mich. Opened at Milwaukee, Wis., June 22, 1908, by Major W. V. Hudson, corps of engineers:

Name and residence of bidder.	Adolph Green Bay, Wis.	Hughes, McDonnell & Beauvais, Muskegon, Mich.	Greiling Bros., Green Bay, Wis.
354,000 ft. B. M. hemlock timber and plank, per M. ft. B. M. ....	\$26.50	\$35.00	\$33.00
8,500 ft. B. M. pine timber and plank, per M. ft. B. M. ....	37.50	50.00	45.00
17,000 lbs. wrought iron and steel screw bolts and wire spikes, per lb. ....	5c	5c	5c
7,500 tons of stone, per ton of 2,000 lbs. ....	1.10	1.75	1.65
5,300 cu. yds. back filling, per cu. yd. ....	50c	50c	50c
Dredging 80,000 cu. yds., per cu. yd. ....	31c	32c	20c
Removing old pier, for the work, ....	2,400.00	6,000.00	24.50
Total .....	\$48,649.75*	\$61,040.00	\$51,289.50

\*Lowest bid.

**DREDGING AT GRAND MARAIS.**

Abstract of bids for dredging at Grand Marais, Mich., opened by Major Graham D. Fitch, Corps of Engineers, at Duluth, Minn., July 9, 1908:

No. of bid.	Name and address of bidder.	Per cu. yd. measured, 70,000 to 90,000 cu. yds.
1—	Duluth Marine Contracting Co., Duluth, Minn. ....	25c
2—	Great Lakes Dredge & Dock Co., Duluth, Minn. ....	22.5c
3—	Zenith Dredge Co., Duluth, Minn. ....	23c
4—	Lake Erie Dredging Co., Sault Ste. Marie, Mich. ....	18.75c*

\*Accepted.

Classification—	Approximate Quantities.
Earth excavation .....	cu. yds. 40,000
Rock excavation .....	cu. yds. 4,500
Embankment .....	cu. yds. 4,300
Concrete .....	cu. yds. 7,250
Piling, round .....	lin. ft. 1,600
Timber .....	M. ft. B. M. 27,000
Lumber .....	M. ft. B. M. 26,000
Iron and steel .....	pounds 230,000
Cement .....	barrels 7,700
Removing lock coffer .....	lump sum .....
Dwellings .....	number 3
Outbuildings .....	number 3
Cisterns .....	number 3
Office .....	number 1
Drains .....	lin. ft. 500
Skilled labor .....	hours 1,000
Unskilled labor .....	hours 2,000

Total .....

**BIDS FOR DAM, TUG FORK, BIG SANDY RIVER.**

Abstract of proposals for constructing dam, guidewalls and dwellings at lock No. 1, Tug Fork of Big Sandy River at Saltpeter, W. Va., received in response to advertisement dated June 2, 1908, and opened July 2, 1908, by Lieut. Col. J. G. Warren, Corps of Engineers, U. S. Army, at Cincinnati, Ohio:

Classification—	Approximate Quantities.	(1) Ohio River Contract Co., Evansville, Ind.	(2) Mason & Hanger Co., Richmond, Ky.
Earth excavation .....	cu. yds. 37,000	Unit. \$ 0.60	Unit. \$ 0.55
Rock excavation .....	cu. yds. 50	Total. \$ 22,200	Total. \$ 20,350.00
Embankment .....	cu. yds. 8,800	Unit. 2.00	Unit. 3.00
Concrete .....	cu. yds. 8,300	Total. 4.40	Total. 150.00
Piling, round .....	lin. ft. 3,500	Unit. 0.50	Unit. 0.40
Piling, sheet .....	lin. ft. 1,000	Total. 41,500	Total. 3,520.00
Timber .....	M. ft. B. M. 28,000	Unit. 0.40	Unit. 0.60
Lumber .....	M. ft. B. M. 26,000	Total. 1,400	Total. 2,100.00
Iron and steel .....	pounds 210,000	Unit. 0.60	Unit. 0.35
Cement .....	barrels 9,000	Total. 600	Total. 350.00
Dwellings .....	number 2	Unit. 1,680	Unit. 80.00
Outbuildings .....	number 2	Total. 2,080	Total. 2,240.00
Cisterns .....	number 2	Unit. 200.00	Unit. 100.00
Office .....	number 1	Total. 200	Total. 2,600.00
Drains .....	lin. ft. 400	Unit. 100.00	Unit. 0.07
Skilled labor .....	hours 1,000	Total. 300	Total. 14,700.00
Unskilled labor .....	hours 2,000	Unit. 275.00	Unit. 1.80

Totals .....

Classification—	Approximate Quantities.	(3) Miller Bros., North Vernon, Ind.	(4) Advance Sand & Construction Co., Grafton, Pa.
Earth excavation .....	cu. yds. 37,000	Unit. \$ 0.50	Unit. \$ 0.60
Rock excavation .....	cu. yds. 50	Total. \$ 18,500	Total. \$ 22,200.00
Embankment .....	cu. yds. 8,800	Unit. 2.00	Unit. 3.00
Concrete .....	cu. yds. 8,300	Total. 100	Total. 150.00
Piling, round .....	lin. ft. 3,500	Unit. 0.40	Unit. 0.50
Piling, sheet .....	lin. ft. 1,000	Total. 3,520	Total. 4,400.00
Timber .....	M. ft. B. M. 28,000	Unit. 0.50	Unit. 0.60
Lumber .....	M. ft. B. M. 26,000	Total. 45,650	Total. 49,800.00
Iron and steel .....	pounds 210,000	Unit. 0.60	Unit. 0.65
Cement .....	barrels 9,000	Total. 1,750	Total. 2,275.00
Dwellings .....	number 2	Unit. 600	Unit. 90.00
Outbuildings .....	number 2	Total. 70.00	Total. 1,960.00
Cisterns .....	number 2	Unit. 2,600	Unit. 95.00
Office .....	number 1	Total. 2,470	Total. 2,470.00
Drains .....	lin. ft. 400	Unit. 18.20	Unit. 0.08
Skilled labor .....	hours 1,000	Total. 16,800	Total. 18,800.00
Unskilled labor .....	hours 2,000	Unit. 2.00	Unit. 2.00

Totals .....

Classification—	Approximate Quantities.	(5) W. W. Lindsay & Co., Philadelphia, Pa.	(6) H. E. Talbott Co., Dayton, O.
Earth excavation .....	cu. yds. 37,000	Unit. \$ 0.70	Unit. \$ 0.50
Rock excavation .....	cu. yds. 50	Total. \$ 25,900	Total. \$ 18,500.00
Embankment .....	cu. yds. 8,800	Unit. 3.00	Unit. 3.00
Concrete .....	cu. yds. 8,300	Total. 150	Total. 150.00
Piling, round .....	lin. ft. 3,500	Unit. 0.50	Unit. 0.50
Piling, sheet .....	lin. ft. 1,000	Total. 4,400	Total. 4,400.00
Timber .....	M. ft. B. M. 28,000	Unit. 0.50	Unit. 0.50
Lumber .....	M. ft. B. M. 26,000	Total. 1,750	Total. 1,750.00
Iron and steel .....	pounds 210,000	Unit. 0.60	Unit. 1.00
Cement .....	barrels 9,000	Total. 600	Total. 1,000.00
Dwellings .....	number 2	Unit. 50.00	Unit. 50.00
Outbuildings .....	number 2	Total. 1,400	Total. 1,400.00
Cisterns .....	number 2	Unit. 1,300	Unit. 100.00
Office .....	number 1	Total. 2,600	Total. 2,600.00
Drains .....	lin. ft. 400	Unit. 0.06	Unit. 0.095
Skilled labor .....	hours 1,000	Total. 12,600	Total. 19,950.00
Unskilled labor .....	hours 2,000	Unit. 1.50	Unit. 1.75

Totals .....

**CONCRETE BUILDINGS IN LOUISIANA.**

Col. Ernest H. Ruffner, government engineer, New Orleans, La., opened bids on July 8 for the construction of 17 reinforced concrete buildings at Burrwood, La. Following were the bids received:

Houses 1, 2, 3, 4.	Houses 1-12.	Office Building.	Total.
Each.	Each.		
Richard M. Murphy, New Orleans, La. ....	\$3,500.00	\$2,750.00	\$49,250.00
John S. Pattenboffer, New Orleans, La. ....	3,300.00	3,244.00	54,297.00
Doullut & Williams, New Orleans, La. ....	3,382.75	2,306.50	52,515.50
Peter Eskald, Biloxi, Miss. ....	3,233.84	2,150.00	49,157.56
John Rensch, New Orleans, La. ....	3,897.00	2,467.00	63,655.00

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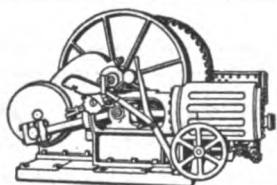
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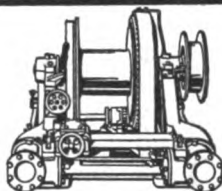
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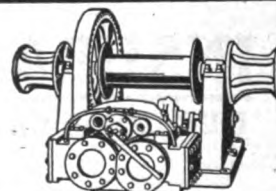
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Breyman, G. H., & Bros.....	39	Great Lakes Dredge & Dock Co.	39	Milwaukee Dry Dock Co.....	5	Smooth-On Mfg. Co.....	51
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Chase Machine Co.....	36	Helm, D. T., & Co.....	48	New York Ship Building Co..	7	Superior Ship Building Co....	4
Chicago Ship Building Co.....	4	Holmes, Samuel.....	48	†Nicholson Ship Log Co....	—	Thornycroft, John I., & Co...	43
Clemente, C.....	35	Hoyt, Dustin, Kelley, McKeehan & Andrews.....	48	Northern Dredge Co.....	39	Tietjen & Lang Dry Dock Co.	50
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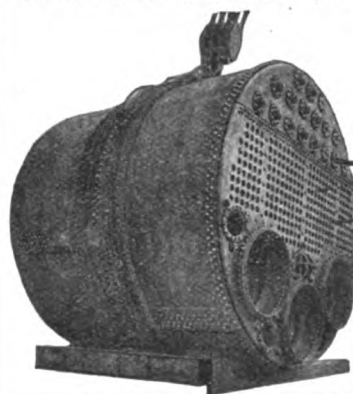
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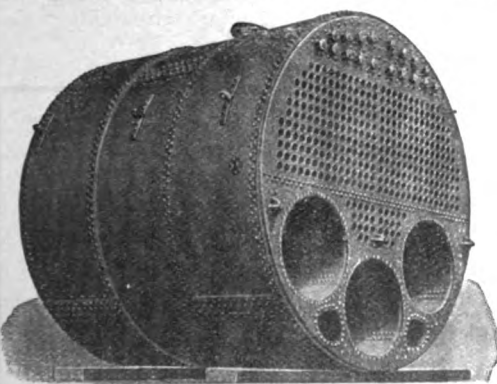
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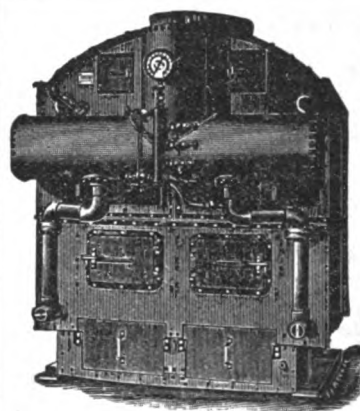
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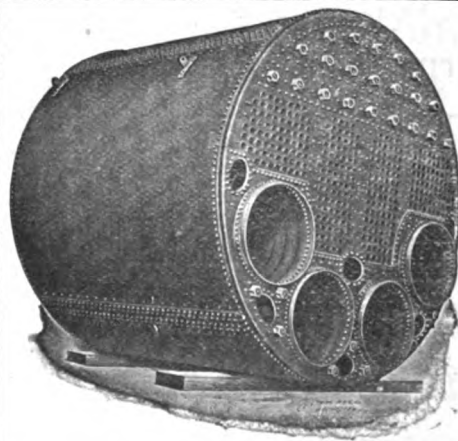
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**PROPOSALS.—SALE OF U. S. VESSELS** St. Mary's and Shearwater. Sealed proposals will be received at the Navy Department until noon on the 5th day of August, 1908, at which time and place they will be opened, for the purchase of the U. S. S. vessels St. Mary's and Shearwater, appraised values \$4,000 and \$1,200, respectively. They will be sold for cash to the person or persons or to the corporation or corporations offering the highest price therefor. A separate proposal for each vessel bid upon must be submitted in a sealed envelope addressed to the Secretary of the Navy, Washington, D. C., endorsed "Proposals for the purchase of the U. S. S. ...." (naming the vessel for which offer is made), and each proposal must be accompanied by a satisfactory certified check for not less than 10 per cent of the amount of the offer. On application to the Navy Department, forms of bids and bonds, together with the terms and conditions of sale, also a printed list giving general information concerning these vessels will be furnished. The vessels can be examined at any time after this date by applying to the Commandants of the navy yards, New York, N. Y., and Philadelphia, Pa., respectively, where they now lie. They must be removed from the limits of said yards within such reasonable time as may be fixed by the Department. The Department reserves the right to withdraw either or both of the above-named vessels from sale and to reject any or all bids. **TRUMAN H. NEWBERRY, Acting Secretary of the Navy.** June 30, 1908.

**PROPOSALS FOR DREDGING.—U. S. Engineer Office, 813 Prospect Ave. S. E., Cleveland, Ohio, July 17, 1908.** Sealed proposals for dredging Toledo Harbor, Ohio, will be received at this office until 2 P. M., Standard Time, July 30, 1908, and then publicly opened. Information furnished on application. **John Millis, Lieut. Col. Engrs.**

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